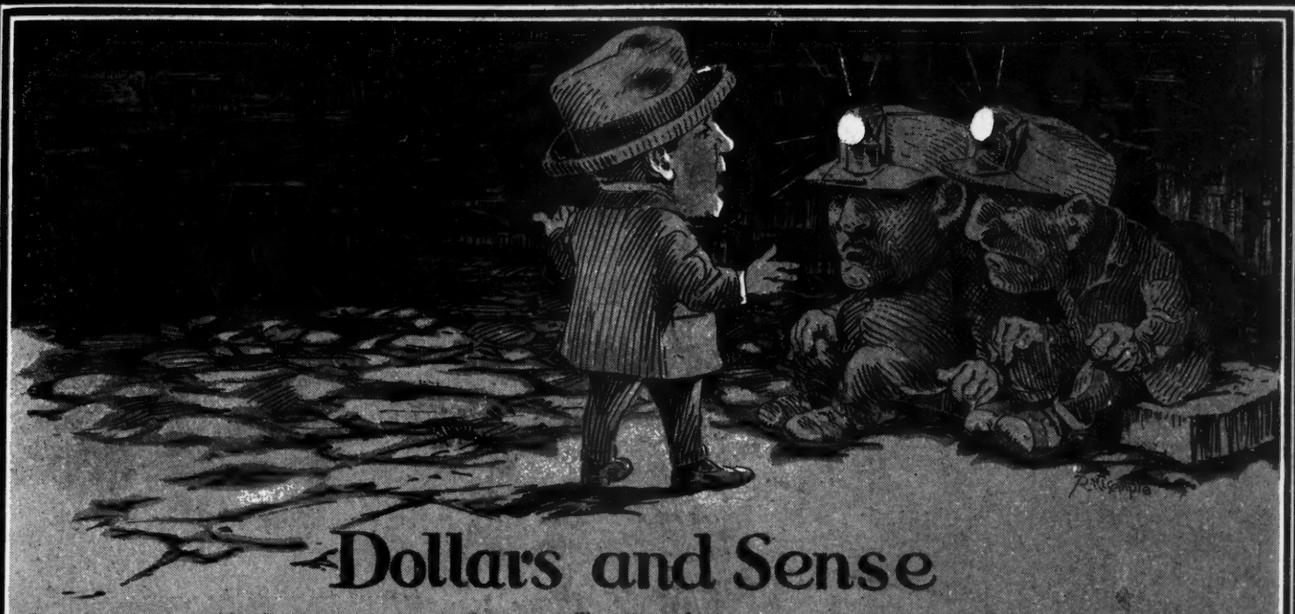

Dollars and Sense

Back in one of the Northwest panel sections where the lights along the entry flicker and waver uncertainly as the substation outside alternately picks up and drops its load, Superintendent Grettum groped his way past the gob in one room; ducked his head under the upper breakthru, and emerged into the adjoining working place.

From there it was but a few short steps to the face. To the uninitiated it was an eerie sight that met his eyes with two figures squatting on a slab of draw-slate among the weaving shadows playing about an idle mining machine.

A gruff Howdy was exchanged between the Boss and the machine runner and his helper.

"Down again, eh?" Grettum shot a self-evident question at the pair.

"Yeh," was the laconic reply of both.

"Whenever 'Bill' starts moving a trip with his gathering motor up the entry, we just close up shop for six or eight minutes until he lands out on the haulage-way. The voltage turns sour on us and the armature hasn't enough ambition to drag the cutter chain through hot butter. He usually stops us dead in our tracks."

The runner continued: "You might as well place us on day work if this keeps up. The only way you'll ever get these rooms cut is with a gang of brawny Polocks and bright picks."

The Circuit Breaker with Brains

The Chief frowned. "I reckon it is bad," he mumbled.

"It's rotten," the two chorused.

"When I bought the machine," Grettum explained, "it sure looked like big dollars and cents on our output. Its turned out to be big dollars in investment and no sense in trying to run it off an electric light socket.

"The bonds are all in pretty decent shape, too. Guess it's as the Automatic man claims, we are just getting too far from our 'sub,' even with the large feeder line we've got running out this way."

"Well, no time for wiggle and wabble, as the Republicans used to say," Grettum declared; "we'll have to do as that Automatic guy suggested and stick in sectionalizing breakers and confine these overloads to their own little sections. I'd have bought 'em the last time he was here only we were hard pressed for ready 'jack.'"

"As far as that goes we still are, but there's no sense in handicapping thousands of dollars' worth of equipment to erratic operation from poor power when a few hundred additional iron men will correct our voltage troubles."

"You said it," the runner and his mate agreed. "Give us the breakers and give 'em to us quick."

THE AUTOMATIC RECLOSING CIRCUIT BREAKER CO.

COLUMBUS, OHIO, U. S. A.

DISTRICT SALES OFFICES:

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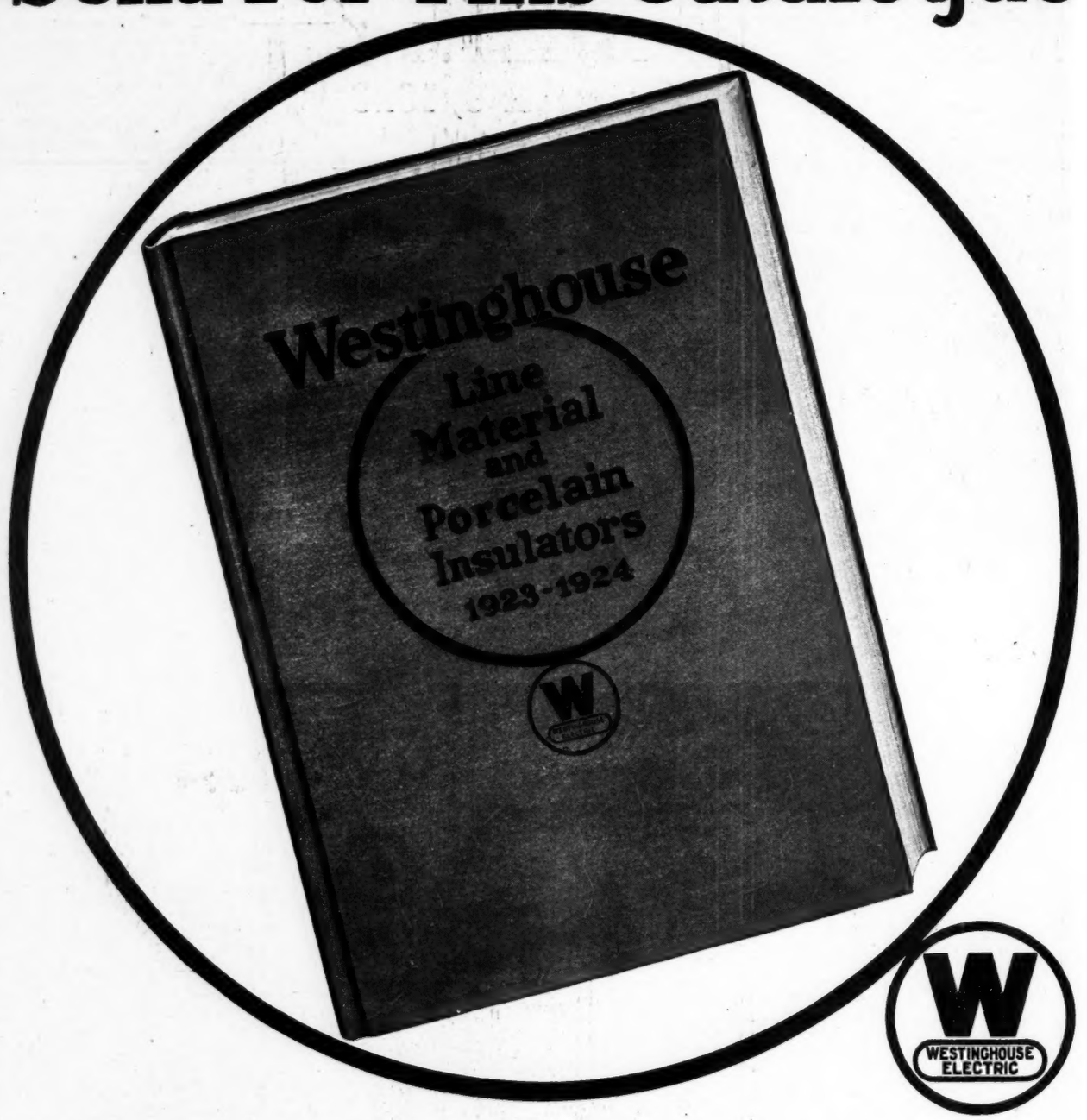


It illustrates and describes the complete line of Westinghouse Overhead Line Material and Porcelain Insulators.

Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa.

Westinghouse

COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

Volume 24 NEW YORK, SEPTEMBER 6, 1923 Number 10

Small but Irritating

IN DIGGING up and publishing the records on 750 cars of anthracite shipped into New England last winter the Coal Commission airs some coal-trade scandal. It is a scandal, of course, that a car of coal should be subject to not one but several rake-offs totaling from $4 to $5 per ton. Such extravagant profits as these, of course, are unusual and could be possible only under such conditions as last winter. When the demand for coal can be met only by exercise of such trade practice it is well to inquire into causes.

The first cause was the strike of the miners, which cut off some 40,000,000 tons of needed production. The other causes are small by comparison. There is nothing and no way to prevent the repetition of such pyramiding of middlemen's profits, or for that matter of extraordinary operators' profits on the part of those who will take them, if there is another winter of strike and short hard-coal supply.

Startling as the figures are the total tonnage on which such margins are extorted or even possible of extortion is small. When New England takes several thousand cars of anthracite each week throughout the year, 750 cars on a part of which there was gouging, is small but irritating—even exciting—news.

Punishment—Not Dissolution

OUR contemporary the *Iron Age* last week urged that the government take steps to dissolve the United Mine Workers as "an organization that is inimical to public welfare and illegal in its practices." We cannot hold with the *Iron Age* that the union should be abolished, nor do we believe that is really what is meant in this instance.

In the first place it is useless to talk of doing away with the miners' union. It is too strong and too dear to the hearts of many workers. Furthermore, unionism is an important and necessary factor in the coal industry. It has brought the mine worker to an advanced position, has stabilized his wages and prevented in large areas a form of cut-throat competition of bygone times that made operators sell their men rather than their coal. It has even stabilized conditions in the non-union fields—put those districts on good behavior. The working conditions and wages of non-union coal miners in recent years have been above the average for the organized workers. No, the coal industry does not want the union dissolved—not even the non-union operators wish it—nor would it be in the public interest. The conduct of the United Mine Workers since the war has been such as to call for punishment rather than dissolution.

The policy and methods of the union are and have been militant, arrogant and unreasoning in the extreme. John L. Lewis, as head of the organization, takes the firm position that he is hired by some 600,000 fighting industrial workers to exact from society every concession, advantage and dollar that the "full economic strength" of such a body can be made to yield. It is admitted that he does a good job. Also he believes in his cause.

The country is impotent before such a policy and type of leadership. It is impotent because our political leaders fear its power and are timorous about telling the public the whole truth. Some hold to the charitable belief that by soft dealing the good that is in the union can be made to assert itself. The only way to bring the Lewis policy to an end is to defeat its workings. That means, in plain language, for the country to get behind a strike and see it through. No wonder Lewis opposes arbitration—he can get the same or better terms by direct action that at once entrenches his position and solidifies the union. The present strike will end when the public says "enough."

Roosevelt and Pinchot

GOVERNOR PINCHOT has not followed the plan of action of his former chief, President Roosevelt, who in 1902 had a similar situation on his hands. After the anthracite mine workers had been on strike for some five months in the summer of 1902, the President forced the reluctant operators to agree to arbitration. He did not attempt to tell either party what it should do or to dictate the terms of settlement for that momentous strike. In one important respect conditions were similar to those of today. The operators, prior to the closing of the mines, were insistent that the public would not meet the advance in price necessary to cover a wage increase and that competition with bituminous coal had already set an upper limit to what could be charged for hard coal.

Governor Pinchot, on the contrary, has set himself up as the arbitrator and seemingly has taken the position that the public interest is so great that both the operators and the mine workers must accept at once his snap judgment of the terms of settlement and not stop the production of coal. It is true that he lacked not in sources of information. He was not obliged to start investigation, for the resources of the Coal Commission were put at his disposal. So, with some two days and the assistance of experts of all shades of opinion—volunteers and otherwise—at his command, the Governor worked out and announced his formula for a settlement.

It is not pertinent or necessary to comment on Mr. Pinchot's idea of what constitutes even-handed justice for all three parties at interest, save to note that his very evident anxiety to be the one to prevent a strike must have prompted his proposal to grant a 10 per cent

increase in wages. A makeshift compromise always involves concessions. That was one for the miners. For the operators he said that the question of the open or closed shop is not involved, and thus laid aside the demand for the check-off. And for the public, which already finds the price of hard coal too high, he proposes the fantastic theory that the added cost of production, which he recognizes must be absorbed somewhere along the line by someone, will come out of freights and distributors, because he thinks it should.

Governor Pinchot deserves credit for his attempt to break the second deadlock in negotiations, but his valor is more praiseworthy than his discretion. The strike is on; production has stopped. Negotiations between the operators and miners, with Mr. Pinchot as a go-between, are still on. As an unsought arbitrator he failed; it remains to be seen whether as a mediator he will fare better.

Defeatism

DERAILMENTS in our coal mines have often been considered as acts of God—as something that cannot be avoided and for which no one is responsible. They are surely more amenable to treatment than this attitude would indicate. If railroads had dismissed the matter as cavalierly as do our managers, engineers and mine foremen, people would be afraid to travel on the railroad. As a plain matter of fact we have only just begun to study mine track. Our speeds are slow but our curves are sharp and one operating condition compensates for the other.

Mr. Martin in this issue gives the mining engineer much to think about when he shows that curves and switches cause loss of power where the speed must be lessened by braking for their safe "negotiation," when he indicates that they may give a resistance equal to a 2-per cent grade even when properly laid and elevated and when he tells us that the rails should be spread almost 1⅛ in. for a radius of 50 ft. where the wheelbase is 42-in.

But what is the real wheelbase? Surely on a curve it is the projected distance in the line of the track between the point where one of the front wheels of a truck rubs the ball of one rail and the point where one of the rear wheels rubs the opposing rail. It would be well if this clearance wheelbase were given for every locomotive so that the correct spread of the rails for every curve might be determined. Certainly the clearance wheelbase is much greater than the wheelbase as we understand it. Assuming that the flange is not coned and the ball of the rail is not rounded at the edge and that the contact between the two is at the top of the rail—three things which are not true—the clearance wheelbase would be longer than the true wheelbase by over 11 in. Supposing we have a 1-in. flange and the wheel is 30 in. in diameter and, further, let us assume that the tread has been worn all over 1 in., then the flange depth will be 2 in. and the increase in wheelbase from the point of view of ability to turn on a curve will be 15½-in. This added to a 42-in. wheelbase is quite important. As stated, there is a degree of uncertainty about such a figure the determination of which would be well worth while. Why should not the manufacturer give it for a standard shape of mine rail the weight of which is recommended for his locomotive?

Until we know more about sharp curvature, and at coal mines our curves are sharp at best, we must not permit ourselves to indulge in defeatism and declare that derailments are inevitable. Some companies rarely have a derailed locomotive, and if they have succeeded why cannot others? We can avoid derailments by using easier curves and save money thereby doubtless, but that is an unscientific way of approaching the problem. Economically speaking, curves should be made as sharp as they can be operated with safety and economy. Easy curves weaken pillars and roadways, often involve heavy timbering and always expensive trackwork.

For this reason we should know just how sharp curves can be made and still be "negotiable" at speed, and if the answer is that they cannot be made safe then let us know the sharpest curve that is safe and how it can be laid to avoid accident and also just what curve will be most profitable for a certain daily tonnage with given conditions of roof, always bearing in mind the diameter of the wheel and the size of the flange.

With the limitations of the coal mines in view the whole problem of tracks and trucks arises anew. A few years hence doubtless we shall find it has been so carefully studied that it has assumed a new and more definite aspect.

Substitutes

GOVERNORS and Governors' representatives from eleven anthracite-consuming states gathered in New York last week at the invitation of the Federal Fuel Distributor to talk over ways and means of keeping the people warm in the event of a sustained hard-coal strike. The significant thing about the meeting was that there was but one concrete proposal made. So far as the Governors were concerned, they just "marched up the hill and then marched down again." Most of them had experience last winter and previously in handling coal shortages and they know that it is no sinecure. But when it came to talking over the prospects in the recent situation they were headed nowhere.

The one concrete proposal was made by the soft-coal operators. It was simply stated. If there is no hard coal, then the people must use something else and that something else must be largely bituminous coal. Nothing can fill the gap so quickly. And the soft-coal men said they were prepared to see that their product was properly distributed and to co-operate with the various state authorities in taking care of emergencies. They offered to have the government set what it considered a fair price. And then the soft-coal men left the meeting. The Governors took the very sensible view that there is nothing to do now and that their job is to accept the good intentions of the bituminous-coal operators at their face value and to do whatever the Federal Fuel Distributor might from time to time suggest in the way of getting coal to their people.

There will be no rush for substitutes; that will be one of the difficulties. So long as there is hope that the strike is to be of short duration retail dealers are and will be reluctant to buy something that they may not be able to sell. Householders will buy substitutes only when they are close to actual need. Really all there is to do now is to continue the education of the householder and many of the retailers in the possibilities of substitutes, show them whenever and wherever possible how such fuel can be used and let the normal channels of distribution take care of getting it to them as the need arises.

Southern Field Has Most Beds and Deepest Workings In Entire Pennsylvania Anthracite Region*

Fifty Years' Operation Sees Output per Man Increase 8.1 per Cent, While Every Other Field Except Panther Creek Loses — Irregular Seams Present Many Problems and Delay Complete Electrification

BY DEVER C. ASHMEAD
Kingston, Pa.

A NUMBER of superlatives are necessary in discussing fifty years of operation in the Southern field of the Pennsylvania anthracite region. The field is underlaid with twenty-two beds, the largest number in any section of the whole region. The maximum depth is the greatest there. Geologic upheavals left the beds in the most disturbed positions, some of the coal having been pulverized to a point of worthlessness in the process. The production per man in this field shows the greatest increase since 1872 of that in any field, though this increase is only 8.1 per cent and leaves the average daily output per man at a bare 1.67 tons. Electric haulage motors appeared earliest there, though electrical development thereafter lagged behind the other fields. In most respects, however, the field has followed the general course of the whole anthracite region toward ever-increasing difficulty and cost of operation.

The Southern field outlined for the purposes of this article is practically identical with the territory commonly called by that name. However, a few collieries at the east end of it were added to the Panther Creek field discussed previously, and are excluded here. Data for the Southern field are sparse because the companies did not furnish to the State Department of Mines information on depth of workings and thickness of beds. Practically no data on the number of employees, tonnage and haulage were reported by inspectors during the years 1872 to 1877—the first period in the fifty years covered in this study—but a considerable amount is available after 1877.

TABLE LX. NUMBER OF COLLIERIES IN THE SOUTHERN FIELD

Years	Total as Reported by Department of Mines	Having Thickness and Depth Data	Having Tonnage Data
1872	64	0	0
1877	39	0	3
1882	54	0	38
1887	31	0	19
1892	32	0	22
1897	37	0	30
1902	33	0	28
1907	35	0	30
1912	35	0	30
1917	39	0	31
1922	41	0	35

Although the maximum number of collieries shown as operating in any one year is only sixty-four, there have been, according to the state reports, a total of 134 opened during the fifty years since 1872. Only nine of these have operated the whole eleven periods covered by this study. Three collieries operated through ten periods, four through nine periods, three through eight periods, six through seven periods, six through six periods, eleven through four periods, ten through three periods, twenty-two through two periods and fifty-two operated in only one period. This short-time operation of the collieries has affected the production of coal as will be brought out later in this article.

Twenty-two beds appear in this district—probably more than in any other of the anthracite regions. They are especially numerous in what is now known as the 18th Anthracite Inspection District. In the whole Southern coal field the following beds are found, named in order from the surface down. Lewis, Palmer, Little Tracy, Big Tracy, Diamond, Little Orchard, Orchard, Primrose, Holmes, Mammoth, Skidmore, 7 ft., Buck Mountain, Scotts Steel, Lykens Valley No. 0, No. 1, No. 1½, No. 2, No. 3, No. 4, No. 5, and No. 6. Of course all of these beds are not workable over the whole area of the Southern coal field. The coal lies as is shown in Fig. 75 in a great trough. This makes the beds steeply inclined. Bed depths are greater here than in any other region in Pennsylvania. At one operation a shaft 2,500 ft. deep is contemplated. In parts of the region the upheaval has been so great that the coal has been rubbed between the top and bottom rock and has been almost pulverized, so that at the present time this coal has little value and cannot be mined.

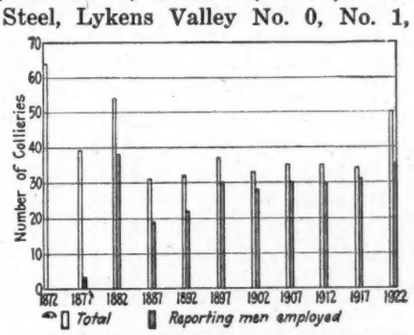


FIG. 74 — NUMBER OF COLLIERIES IN SOUTHERN FIELD
This diagram shows the number of collieries on which depth and thickness and tonnage data were available. It also shows the number of collieries in the field.

The power-consumption curve in Fig. 76 and the figures in Table LXI show the same general decrease in tons of coal produced per boiler and engine horsepower installed that has been noted in articles describing the other districts.

Generally speaking, the collieries in this region have been more backward in adopting the use of electricity than elsewhere. Centralization of mine power plants such as may develop in this district will have a tendency to reduce the amount of power required to produce the coal or it will permit the greater use of electricity and electrical machinery, which may increase the power consumption per ton, but will tend to decrease the man-power and therefore increase the production per employee.

In 1921 the State Department of Mines reported that the boiler-horsepower installed amounted to 71,360 as against 72,620 in 1917. At the same time the number

*This is the seventh in a series of articles by Mr. Ashmead describing conditions in the fields of the Pennsylvania anthracite region. Previous articles appeared in *Coal Age* on Feb. 22, March 22, April 5, May 10, May 31 and June 21. The final article, which summarizes the study for the anthracite region as a whole, will appear later.

TABLE LXI. POWER USED IN PRODUCTION OF ANTHRACITE IN THE SOUTHERN FIELD

Years	Boiler Horse-power Installed	Engine Horse-power Installed	Tons Produced per Boiler Horse-power	Tons Produced per Engine Horse-Power	Tons of Coal Hauled per Mule per Day	Underground Locomotives per 100,000 Tons Produced per Year
1887.....	16,080	.....	0.68	....	13.7	0.003
1892.....	23,790	.....	0.53	....	11.7	0.003
1897.....	44,512	.....	0.53	....	18.2	0.003
1902.....	48,134	50,135	0.50	0.48	18.6	0.05
1907.....	65,973	88,164	0.37	0.31	16.8	0.40
1912.....	68,965	105,703	0.44	0.29	19.6	0.62
1917.....	72,620	116,555	0.44	0.27	23.0	1.05
1921.....	71,360	.....	0.42	.....	21.8	1.28

of collieries reported in the region increased from 39 in 1917 to 41 in 1921. So instead of expecting a decrease in the boiler-horsepower installed, one would expect an increase. Part of this decrease may be explained by the fact that some of the independent collieries have abandoned their boiler plants and have purchased power from central power stations. At one of these there had been a plant with a boiler installation of about 2,000 hp.

It was in this region that electric motive power was first introduced in the haulage of coal. Nevertheless, the number of underground locomotives is smaller in this region than in many of the other regions. The Lackawanna County district has 3.12 motors per 100,000 tons of coal produced annually in 1921; the Wilkes-Barre district, 2.64; Nanticoke, 2.36; Eastern Middle field, 1.06; Panther Creek, 2.03; Western Middle field, 1.17; and the Southern field has but 1.28.

Of course the geological conditions in many of the mines do not permit the use of a large number of locomotives, for the beds are steeply pitching and the locomotives can be used only for main haulage. Fig. 77 shows that the number of locomotives has had practically an even, steady increase since 1902.

Unfortunately, data on the number of mules in service do not extend to the period before 1887, so it is impossible to estimate the amount of coal hauled per underground locomotive. The curve is of value only as it shows the influence of the motor on the amount of coal hauled per mule.

Although the number of collieries in the Southern field increased from 39 in 1917 to 41 in 1921, there was a decrease in the number of mules in service from 1,385 in 1917 to 1,376 in 1921. Although this decrease amounts to only 9 mules, there were 3 more collieries and these collieries were mostly small ones where locomotives were few, so the decrease is significant.

Output per man in the Southern field increased 8.1 per cent since 1872. This is the greatest increase in the whole anthracite region. Only one other district —Panther Creek—showed any increase whatever. The others decreased. Taking the Southern field curves shown in Fig. 78 and for the moment considering only the bottom set of curves, which show the production per employee, it is seen that the solid line which represents the original data shows an increase in the amount of coal produced per man. When these original data are corrected for sizes not shipped in the earlier years, and further corrected to reduce all data to an 8-hour day basis from the 10-hour day in effect before 1902 and the 9-hour day before 1916 the dot-and-dash curve results. This shows the same general increase in production although in a somewhat less degree. If the year 1897 is disregarded, as in the previous article, because of unsatisfactory state reports that year, and the average for 1892 and 1902 is taken in its place, then for the period from 1887 to 1921 there is a steadily increased production per man, if the hectic war year 1917 is properly discounted.

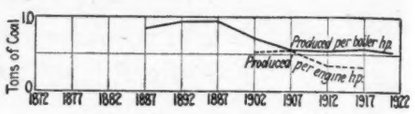


FIG. 76—DAILY PRODUCTION OF COAL PER BOILER AND ENGINE HORSEPOWER INSTALLED

The method of calculating these curves will be found in the Feb. 22 issue of *Coal Age* under Fig. 8 on page 326.

In the Lackawanna County district the decrease in the production per man amounted to 31.2 per cent; Wilkes-Barre, 30.2 per cent; Nanticoke, 21.1 per cent; Eastern Middle field, 30.6 per cent; Western Middle field, 9.1 per cent; in the Panther Creek district production increased 1.6 per cent, while in the Southern field the increase was 8.1 per cent.

TABLE LXII. MULES AND LOCOMOTIVES IN SOUTHERN FIELD

Years	Mules in Service	Inside Locomotives	Years	Mules in Service	Inside Locomotives
1887.....	795	1	1907.....	1,494	33
1892.....	1,138	1	1912.....	1,543	57
1897.....	1,201	2	1917.....	1,385	100
1902.....	1,286	7	1921.....	1,376	115

The average tonnage per man in 1921 in these fields was as follows: Lackawanna County, 1.74; Wilkes-Barre, 1.48; Nanticoke, 2.02; Eastern Middle, 1.95; Panther Creek, 1.89; Western Middle, 1.80; Southern,

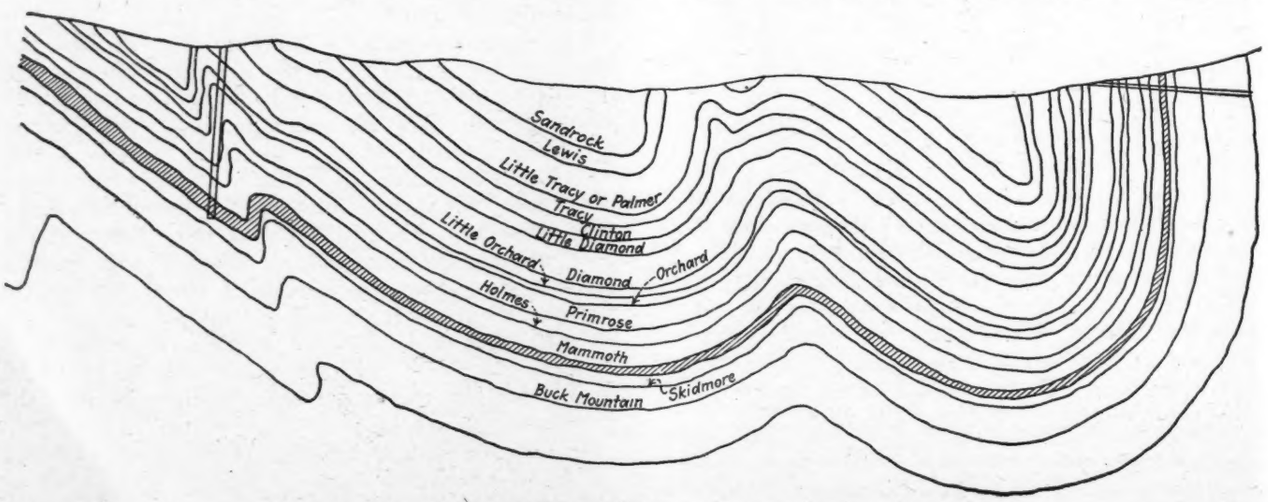


FIG. 75—A GENERAL CROSS-SECTION OF THE SOUTHERN COAL FIELD

1.67 tons. Thus only Wilkes-Barre showed a lower tonnage per employee than the Southern field. In spite of the general increase in output per employee the average production per inside employee dropped 5.8 per cent. The middle set of curves in Fig. 78 illustrates this trifling decrease. The lines undulate uniformly through the 50 years, descending in the first period, then rising between 1887 and 1902 (considering 1897 statistics in error), sinking again to 1907 and finally climbing in the final period to a point just 58. per cent short of the start. The three peak points on the curve—1882, 1902 and 1917—are all within 0.05 tons of each other. During the early years of the half century under discussion a number of collieries were in operation for only a short period. Most of their mining was done above water level. This can plainly be shown by the report of the Second Geological Survey of Pennsylvania, which shows the workings of the mines in 1888. A mine with only a short life is apt to use many men in development work, which naturally tends to reduce the production per man. So in this case the shape of the curve is largely influenced by the fact that many mines in the region were short lived. Thus the production per man in the earlier periods was reduced but the curve actually shows an increase. For example, in 1882 there were reported 13 new operations and it is probable that a considerable amount of development work was carried on. In this same year 16 mines shut down. These mines probably had a greater production per man as the development work in them had probably ceased. In 1887 there were five new mines and 11 quit. In 1892 six opened and nine closed; in 1897 eight opened and seven closed; in 1902 only three opened and seven closed. In 1907 seven opened and three closed; in 1912 only one opened and none closed; in 1917 three opened and two closed. It can readily be seen what influence this continual change in the mines being opened and abandoned in a region would have. From the foregoing it is seen that the greatest change was in the earlier years and that from year to year changes were fewer. This falling off shows the changed policy of the operators, who are now operating their collieries more systematically than in the past.

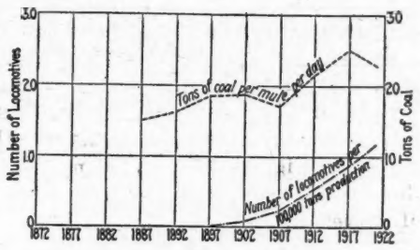

Number of Locomotives
Tons of Coal
Tons of coal per mule per day
Number of locomotives per 100,000 tons production
1872 1877 1882 1887 1892 1897 1902 1907 1912 1917 1922

FIG. 77—AVERAGE DAILY TONNAGE HAULED PER MULE AND NUMBER OF UNDERGROUND LOCOMOTIVES PER 100,000 TONS

On page 327 of *Coal Age* in the Feb. 22 issue under Fig. 9 will be found the description of the method used in the calculation of this curve.

TABLE LXIII. PRODUCTION AND DAYS WORKED IN SOUTHERN FIELD

Years	Production in Gross Tons	Average Number of Days Worked	Years	Production in Gross Tons	Average Number of Days Worked
1882.....	2,152,503	220	1907.....	5,938,368	264
1887.....	1,860,336	231	1912.....	6,318,398	235
1892.....	2,977,004	246	1917.....	7,422,697	287
1897.....	3,759,676	170	1921.....	7,042,500	275
1902.....	2,894,120	131			

TABLE LXIV. AVERAGE DAILY PRODUCTION PER EMPLOYEE

	Per Total Employee			Per Inside Employee			Per Outside Employee		
Years	Reported	Corrected for Small Sizes	Corrected for Time	Reported	Corrected for Small Sizes	Corrected for Time	Reported	Corrected for Small Sizes	Corrected for Time
1882.....	1.25	1.76	1.54	2.01	2.83	2.57	3.46	4.86	3.89
1887.....	0.98	1.32	1.15	1.52	2.04	1.86	2.78	3.73	2.98
1892.....	1.24	1.54	1.34	1.90	2.36	2.15	3.59	4.48	3.58
1897.....	1.74	2.07	1.81	2.79	3.32	3.07	4.62	5.50	4.40
1902.....	1.69	1.80	1.59	2.71	2.89	2.63	4.45	4.76	4.23
1907.....	1.46	1.53	1.42	2.24	2.34	2.09	4.25	4.44	3.95
1912	1.66	1.72	1.60	2.37	2.45	2.31	5.56	5.74	5.10
1917.....	1.90	1.90	1.90	2.58	2.58	2.58	6.16	6.16	6.16
1921.....	1.67	1.67	1.67	2.42	2.42	2.42	5.80	5.80	5.80

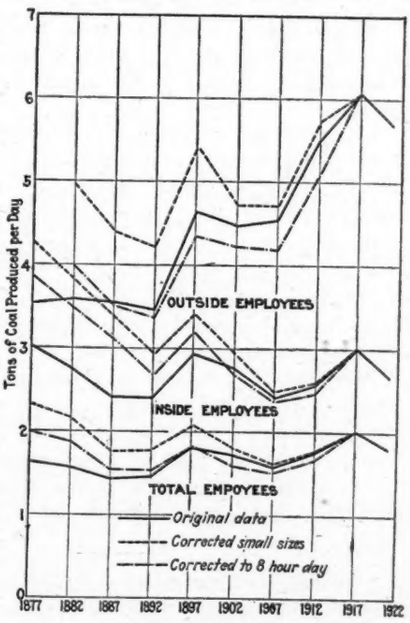

Tons of Coal Produced per Day
OUTSIDE EMPLOYEES
INSIDE EMPLOYEES
TOTAL EMPOYEES
Original data
Corrected small sizes
Corrected to 8 hour day
1877 1882 1887 1892 1897 1902 1907 1912 1917 1922

FIG. 78—AVERAGE DAILY PRODUCTION PER EMPLOYEE

A full description of the methods used in the calculation of these curves will be found in the footnote to Fig. 10 in the Feb. 22 issue of *Coal Age*, page 327.

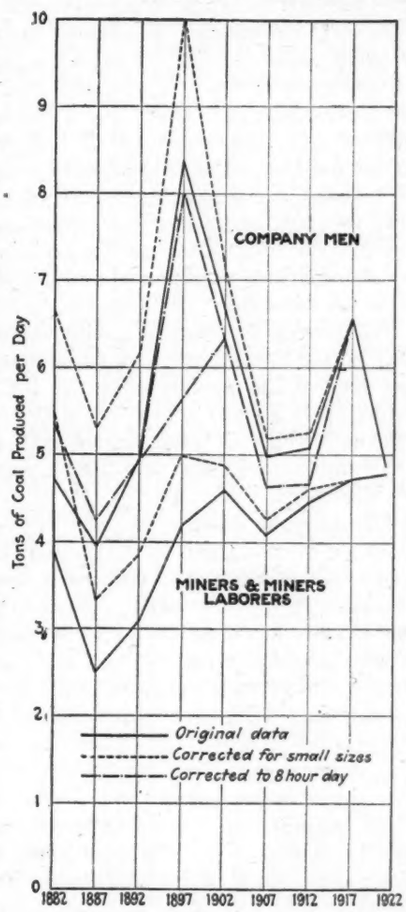

Tons of Coal Produced per Day
COMPANY MEN
MINERS & MINERS LABORERS
Original data
Corrected for small sizes
Corrected to 8 hour day
1882 1887 1892 1897 1902 1907 1912 1917 1922

FIG. 79—AVERAGE DAILY PRODUCTION FOR INSIDE EMPLOYEES

A detailed description of the methods used in the calculation of these curves will be found in the description of Fig. 11 in *Coal Age* for Feb. 22 on page 328.

The upper set of curves in Fig. 78 shows how the improvement in the preparation of coal has affected the production of coal per day per outside employee. There has been a steady increase in the production of this field from 1887 to date. From 1882 to 1921 the increase was 49.1 per cent.

By districts this increase from 1887 was: Lackawanna County, 34.4 per cent; Wilkes-Barre, 2.9 per cent; Nanticoke, 43.1 per cent; Eastern Middle, a decrease of 11.4 per cent; Panther Creek, an increase of 80.6 per cent; and Western Middle, 41.5 per cent. If, however, the lowest point in the production is compared with 1921 the following proportions of increase

TABLE LXV. AVERAGE DAILY PRODUCTION OF INSIDE MEN

Years	Miners and Miners' Laborers Reported	Miners and Miners' Laborers Corrected for Small Sizes	Inside Company Men Reported	Inside Company Men Corrected for Small Sizes	Inside Company Men Corrected for Time
1882	3.90	5.49	5.72	7.59	8.04
1887	2.48	3.34	3.95	5.31	4.25
1892	3.08	3.85	4.95	6.17	4.94
1897	4.19	4.99	8.39	10.00	8.00
1902	4.58	4.89	6.67	7.13	6.34
1907	4.08	4.26	4.98	5.20	4.63
1912	4.46	4.61	5.07	5.25	4.67
1917	4.72	4.72	6.56	6.56	6.56
1921	4.77	4.77	4.89	4.89	4.89

are shown; Lackawanna County, 46.8 per cent; Wilkes-Barre, 47.5 per cent; Nanticoke, 75.2 per cent; Eastern Middle, 47.7 per cent; Panther Creek, 80.6 per cent; Western Middle, 69.1 per cent, and the Southern field, 72.5 per cent. This shows the real improvement in each of the districts due mainly to improved methods of preparation.

In the lower set of curves in Fig. 79, which shows the tons of coal produced per day per miner and miners' laborer, one sees by the dash line, which is the corrected line for small sizes, that in the period 1882 to 1887 there was a sharp decrease in the output. From 1887 to 1902, cancelling the doubtful year 1897, there was an increase. Then the curve turns downward during the next five-year period and the last fourteen years show an increase.

The general increase in production during the fifteen-year period from 1887 to 1902 probably was caused by the general abandonment of the policy of working a colliery only a short time. The decrease in 1902 to 1907 will be discussed later in the article of this series when similar decreases which occurred in other districts are discussed.

The increase during the last 14 years of the curve, probably was caused by a further change in mining policy. During this period there seems to have been a concentration of work. Second mining was conducted more systematically and thoroughly. The amount of development work was not as intensive as it had been in the previous periods. This permitted of greater production. This greater production was influenced by the release of mine cars from the development work, permitting them to be used for coal loading, thus giving the miners better turn.

An example of this is enlightening. At a certain colliery in the Eastern Middle field there is a stripping plant and a slope under operation. Due to an accident, the stripping had to be shut down for a few days and the mine cars, which had been loaded by the steam shovel, went into the slope. With these extra cars the miners were able to load 40 per cent more coal from the slope than they had been able to do in the past. This 40-per cent increase in production counterbalanced the loss of the stripping coal. No more men were employed in the slope than were normally used.

TABLE LXVI. MEN EMPLOYED IN THE SOUTHERN FIELD

Years	Total Employees	Inside Employees	Outside Employees	Miners and Miners' Laborers	Inside Company Men
1882	7,708	4,878	2,830	.....	.....
1887	8,055	5,202	2,854	3,195	2,007
1892	9,724	6,367	3,357	3,927	2,440
1897	12,732	7,908	4,824	5,277	2,631
1902	13,121	8,151	4,970	4,838	3,313
1907	15,417	10,037	5,280	5,518	4,519
1912	16,171	11,334	4,837	6,028	5,306
1917	13,607	9,407	4,200	5,467	3,940
1921	15,469	10,325	4,629	5,232	5,093

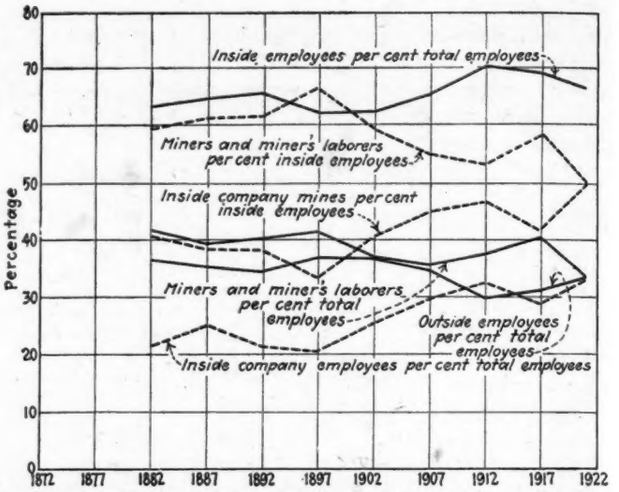


FIG. 80—PERCENTAGES OF EMPLOYEES BY CLASSES
These data were obtained from the reports of the mine inspectors of the Department of Mines of Pennsylvania.

It is possible that the introduction of underground haulage has had a considerable influence on the production of coal. Mechanical haulage naturally handles the mine cars with greater rapidity and therefore less time is consumed from the time of loading to the time of dumping and the return to the loading place. It may be interesting to note that one of the largest of the companies in the anthracite region, having operations in many of the coal fields described in this series of articles, reports that its mine cars make a general average of 1.2 trips per day.

TABLE LXVII. PERCENTAGE OF GIVEN CLASSES OF EMPLOYEES TO TOTAL EMPLOYED IN THE SOUTHERN FIELD

Years	Inside Employees	Outside Employees	Miners and Miners' Laborers	Inside Company Men	Miners and Miners' Laborers (A)	Inside Company Men (A)
1882	63.3	36.7	41.9	21.4	59.4	40.6
1887	64.6	35.4	39.6	25.0	61.4	38.6
1892	65.6	34.4	40.4	21.2	61.7	38.3
1897	62.1	37.9	41.4	20.7	66.7	33.3
1902	62.1	37.9	36.9	25.2	59.4	40.6
1907	65.1	34.9	35.8	20.3	55.0	45.0
1912	70.1	29.9	37.3	32.8	53.1	46.9
1917	69.0	31.0	40.2	28.8	58.2	41.8
1921	66.7	33.3	33.8	32.9	50.5	49.5

(A) To inside employees.

The upper set of curves in Fig. 79 shows the daily production of coal per inside company employee. Here again the 1897 data are manifestly incorrect and the average of 1892 and 1902 should be considered instead. From 1902 there has been a general decrease in the daily output per man. This is partly because of the introduction of electricity into the mines. The development of haulage has tended to decrease the number of men required for this purpose.

There has been a gradual decrease in the number of miners and miners' laborers in this region during the past 40 years. The decrease in the number of outside employees has not been as great as one would be led to believe when one views the curve showing the increased production per outside employee.

IN STUDIES OF LOW-TEMPERATURE CARBONIZATION of coal made by the Bureau of Mines, various sections of coal from the Pittsburgh seam and roof were distilled. The Pittsburgh seam gives as an average 33 gallons of tar per ton. The "rooster" coal above the roof averages 28 gallons per ton; and the roof itself 23 gallons per ton. All tars have the same characteristics.

Curve Resistance Greatly Impedes Mine Haulage; Much Track Spread Needed on Sharp Turns*

Need for Investigation Into Loss of Power in Mine Haulage—Curves May Increase Tractive Effort as Much as a Two-per Cent Gradient —Correct Switch Design Will Make Deceleration Unnecessary

By J. D. Martin
Chief Engineer, Hillman Coal & Coke Co., Pittsburgh, Pa.

NOTHING perhaps that adds to the cost of coal production is more neglected than the design of mine tracks. You can inspect a plant and find up-to-the-minute hoisting equipment, tipple, power plant, machinery and locomotives and may find them properly installed and functioning economically, but when you reach the track, switches and auxiliary apparatus you are likely to find that little progress has been made. The fault does not lie with the manufacturer of track equipment but with the engineers at the mine.

We find at the mines no end of delays due to derailment of locomotive trips, yet it is well realized that derailments always result in time lost, which means less tonnage and consequently lower profits. Perhaps less engineering skill is applied to mine tracks than to any other feature in the installation of mines so far as individual plants are concerned. It is a feature which has been allowed to drift along by itself and to make whatever progress it could. The engineer, superintendent or manager who is precise in his specifications covering a contract for a structure, hoist, or locomotive may order trackwork with only a passing thought as to its application; thus what development and progress has been made has been achieved without any help from the mining industry as a whole.

On the other hand, railroad trackwork design has been placed on a high plane and valuable data and theory have been tabulated for practical use. The investigations of the various engineering societies and the products developed by the manufacturers and tested out in practice have led to a basis of standardization for standard-gage railroad work, and part of the results have found their way into the equipment for use on light track. The classes of equipment are radically different, however, and the same general designs and the same formulas do not generally apply.

As has been stated already, there is much research work to be done, experiments to be performed and formulas to be evolved before we are ready to standardize light-rail track. This is work for engineers scientifically trained; the work must be done in a scientific manner if the results are to be as they should.

The study must include not only the frogs, switch points, switch throws and the necessary fittings, together with the proper design and application of each, but the widening of the gage on curves, curve resistance and curve compensation, as well as track and train resistance, allowable widening of gage for different weights of rail, the size of wheels and tires for various classes of rolling equipment and track, the gage of trucks with relation to the gage of tracks and the increment or decrement in the track gage for different wheelbases, as well as other factors, less important but nevertheless requiring consideration.

In order that the tractive effort of the locomotive shall be kept at a minimum all the factors tending to increase it must be kept at a minimum. Consider:

(1) The grade resistance. This, of course, is determined to a great extent by the local mine conditions, which may not permit the necessary grading to reduce the track grade to that desired. We can, however, in any given case determine just what per cent this grade will be.

(2) The equivalent grade due to journal friction, train resistance and curve resistance. Journal friction clearly depends upon the type of trucks and bearings used, whether plain or roller-bearing. Train resistance depends upon the condition of the track. Curve resistance depends upon: (a) The amount of slipping and sliding of the wheels due to the difference in length between the outer and inner rails on the curve, which difference in length must be taken up in the slipping and sliding of wheels and cannot be compensated by coning the tires, as is sometimes assumed. (b) Flange resistance due to the bearing of the flange against the outer rail wherever the super-elevation of the outer rail does not reduce this resistance to zero. (c) Resistance due to the vertical height to which one or two wheels are lifted vertically throughout the length of the curve wherever the gage of the track is not sufficiently widened.

(3) Resistance due to change in velocity. As the

Radius, Ft.	Degree of Curve
50	180 deg.
100	60 deg.
150	38 deg. 56 min.
200	28 deg. 58

The combined resistance of the curve due to sliding of wheels and flange resistance may be summarized in the formula deduced by Raymond: The total curve resistance in pounds per ton total load.

$$R_c = 0.4 + D\left(\frac{500\,f\,(G + b + \sqrt{G^2 + b^2})}{5{,}730} + 0.04\right)$$

Where D = degree of curve
G = track of gage
b = wheelbase
f = coefficient of friction

RESISTANCES FOR CERTAIN CURVES AND WHEELBASES

Wheelbase, Ft. In.	Resistance in Pounds per Ton	Total Resistance in Pounds per Ton — Radius 50 Ft.	100 Ft.	150 Ft.	200 Ft.
2 0	0.4 + 0.20D	36.4	12.4	8.2	6.2
2 3	0.4 + 0.21D	38.2	13.0	8.6	6.7
2 6	0.4 + 0.22D	39.0	13.6	9.0	7.0
2 9	0.4 + 0.225D	40.9	13.9	9.2	7.2
3 0	0.4 + 0.23D	41.8	14:2	9.4	7.3

INCREASE IN PERCENTAGE GRADIENT FOR VARIOUS WHEELBASES AS DEDUCED FROM PRECEDING TABLE

Radius, Ft.	Wheelbases 24 In.	27 In.	30 In.	33 In.	36 In.
50	1.82	1.91	1.95	2.05	2.14
100	0.60	0.65	0.68	0.70	0.71
150	0.41	0.43	0.45	0.46	0.47
200	0.31	0.31	0.35	0.36	0.37

FIG. 1—RELATION OF RESISTANCE TO CURVE RADIUS

A truck with a 24-in. wheelbase traveling around a curve of 50-ft. radius on a level is subject to a resistance equal to that acting against the same truck on a straight track and having a grade of 1.82 per cent against the load. The coefficient of friction against sliding is assumed as 0.2.

*Abstract of article entitled "Standardization of Mine Tracks," read before Engineers' Society of Western Pennsylvania.

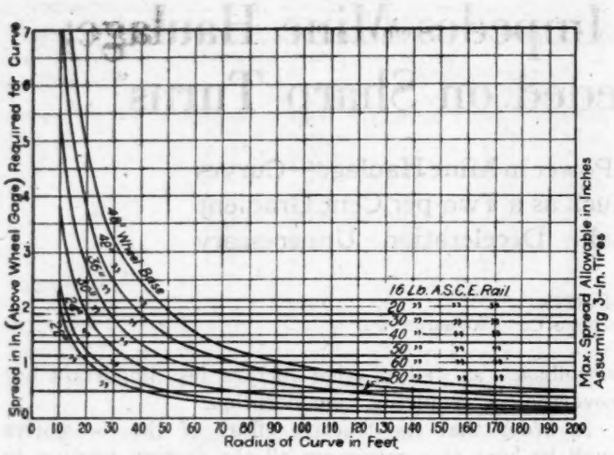

Spread in In. (Above Wheel Gage) Required for Curve
Max. Spread Allowable in Inches Assuming 3-In. Tires
16 Lb. A.S.C.E. Rail
Radius of Curve in Feet

FIG. 2—GRAPH SHOWING GAGE INCREASE ON CURVES

This also shows the maximum spread allowable for wheels with 3-in. tires running over rail of various weights per yard and designed according to American Society of Civil Engineers standards. The curves show that trackwork cannot be designed independently of rolling equipment.

train is accelerated from rest to a certain velocity there is a certain quantity of kinetic energy stored in the train due to the velocity of translation of the train itself and to the velocity of rotation of the wheels. When the train is stopped this kinetic energy is not reclaimed but is lost in heat due to friction as the brakes are applied. Thus it becomes evident that the greater the number of times the train is stopped or retarded in its travel from the face of the shaft bottom or other terminal the greater will be the power loss due to this one cause.

After we have adopted the minimum grade which mining conditions will permit we may have, say, a maximum or ruling grade of 1.5 per cent so far as the track grade is concerned. If the journal, train, and curve resistances are reduced to their equivalent grade, however, we will find that instead of operating a train over a ruling grade of 1.5 per cent we virtually will be operating over as high as 2 or 3 per cent. This can be seen from Fig. 1, where curve resistance alone may be equivalent to as much as a 2-per cent grade.

SPREAD OF RAILS (OVER WHEEL GAGE) FOR A GIVEN WHEELBASE

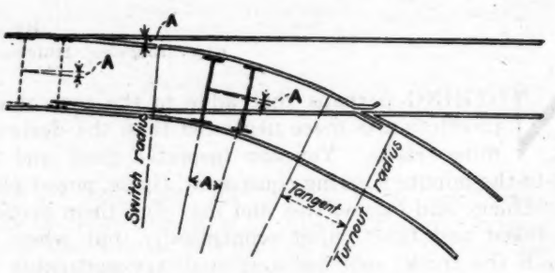
Radius	24 In.		30 In.		36 In.		42 In.		48 In.	
Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.
10	0	0.2020	2 1/16	.....	...	.....	...	.....	...	.....	...
12	6	0.1647	2	.....	...	.....	...	.....	...	.....	...
15	0	0.1319	1 13/16	.....	...	.....	...	.....	...	.....	...
17	6	0.1146	1 11/16	.....	...	.....	...	.....	...	.....	...
20	0	0.0991	1 9/16	0.1565	1 15/16	.....	...	.....	...	.....	...
25	0	0.0801	1	0.1253	1 9/16	.....	...	.....	...	.....	...
30	0	0.0667	13/16	0.0981	1 3/16	0.1504	1 13/16	.....	...	.....	...
40	0	0.0500	5/8	0.0782	15/16	0.1129	1 3/8	0.1540	1 7/16	.....	...
50	0	0.0399	1/2	0.0625	3/4	0.0903	1 1/16	0.1226	1 7/16	0.1602	1 15/16
75	0	0.0275	5/16	0.0417	1/2	0.0600	11/16	0.0813	1	0.1069	1 5/16
100	0	0.0201	1/4	0.0313	3/8	0.0450	9/16	0.0613	3/4	0.0800	1
125	0	0.0160	3/16	0.0250	5/16	0.0360	7/16	0.0490	9/16	0.0640	3/4
150	0	0.0134	1/8	0.0208	1/4	0.0300	3/8	0.0410	1/2	0.0526	5/8
175	0	0.0114	1/8	0.0178	3/16	0.0257	5/16	0.0350	7/16	0.0451	9/16
200	0	0.0100	1/8	0.0156	3/16	0.0220	1/4	0.0310	3/8	0.0392	1/2

FIG. 3—GAGE INCREASE REQUIRED WITH CURVES OF CERTAIN RADIUS

The tabulation does not consider the diameter of the wheels in the widening required on curves. This factor cannot be eliminated and the above tabulation therefore is subject to correction.

These conditions and relations are illustrated graphically in Fig. 2.

The power lost due to overcoming the resistance of acceleration may be diminished considerably if locomotive roads, curves and switches are so designed that the train may be accelerated from rest to the desired velocity and maintained at the same velocity from terminal to terminal. If, however, it is necessary to reduce the speed of the train to a low value for each curve



ANGLES A FOR VARIOUS WHEELBASES AND RADII

Radius	Wheel Base 24 In.	30 In.	36 In.	42 In.	48 In.
10′-0″	11°-32′-13″	14°-28′-40″	17°-27′-27″	20°-29′-12″	23°-34′-42″
12′-6″	9°-12′-25″	11°-32′-13″	13°-53′-12″	16°-15′-37″	18°-39′-53″
15′-0″	7°-39′-44″	9°-35′-39″	11°-32′-13″	13°-29′-36″	15°-27′-58″
17′-6″	6°-33′-48″	8°-12′-47″	9°-52′-15″	11°-32′-14″	13°-12′-35″
20′-0″	5°-42′-30″	7°-10′-50″	8°-37′-30″	10°-04′-40″	11°-32′-10″
25′-0″	4°-35′-19″	5°-44′-21″	7°-11′-07″	8°-02″-52′	9°-12′-25″
30′-0″	3°-49′-21″	4°-46′-50″	5°-44′-29″	6°-42′-59″	7°-38′-40″
40′-0″	2°-51′-58″	3°-35′-00″	4°-18′-05″	5°-01′-11″	5°-44′-21″
50′-0″	2°-17′-33″	2°-51′-58″	3°-26′-23″	4°-00′-50″	4°-35′-19″
75′-0″	1°-31′-41″	1°-54′-37″	2°-17′-33″	2°-40′-29″	3°-03′-06″
100′-0″	1°-08′-46″	1°-25′-57″	1°-43′-09″	2°-00′-21″	2°-17′-33″
125′-0″	0°-55′-00″	1°-08′-46″	1°-22′-31″	1°-36′-16″	1°-50′-02″
150′-0″	0°-45′-50″	0°-57′-18″	1°-08′-46″	1°-20′-13″	1°-31′-41″
175′-0″	0°-39′-18″	0°-49′-07″	0°-58′-56″	1°-08′-46″	1°-18′-35″
200′-0″	0°-34′-23″	0°-42′-59″	0°-51′-34″	1°-00′-10″	1°-08′-46″

ANGLE OF SWITCHRAIL WITH STRAIGHT RAIL

Length of Switch Point	Switch Angle	Length of Switch Point	Switch Angle
1′-0″	16°-57′-35″	8′-0″	2 -14′-19″
1′-6″	11°-12′-50″	9′-0″	1 -59′-23″
2′-0″	8°-23′-15″	10′-0″	1 -47′-27″
2′-6″	7°-10′-51″	11′-0″	1 -37′-40″
3′-0″	5°-58′-45″	12′-0″	1 -20′-32″
3′-6″	5°-07′-21″	13′-0″	1°-22′-39″
4′-0″	4°-28′-50″	14′-0″	1°-16′-44″
4′-6″	3°-58′-55″	15′-0″	1°-11′-37″
5′-0″	3°-35′-00″	16′-0″	1°-07′-09″
5′-6″	3°-15′-26″	17′-0″	0°-58′-00″
6′-0″	2°-59′-08″	18′-0″	0°-55′-43″
6′-6″	2°-45′-20″	19′-0″	0°-51′-40″
7′-0″	2°-33′-30″	20′-0″	0°-50′-09″
7′-6″	2°-23′-17″	.....	.....

SWITCH RADII AND CORRESPONDING SWITCH POINTS

Switch Radius	Length of Switch Points (feet) Wheel Base 24 In.	26 In.	30 In.	36 In.	42 In.	48 In.
10′-0″	1′-6″	1′-6″	1′-6″	.....	.....	.....
12′-6″	2′-0″	2′-0″	1′-6″	.....	.....	.....
15′-0″	2′-6″	2′-0″	2′-0″	1′-6″	.....	.....
25′-0″	4′-0″	4′-0″	3′-6″	2′-6″	2′-6″	2′-0″
50′-0″	7′-6″	7′-6″	6′-6″	5′-6″	4′-6″	4′-0″
75′-0″	12′-0″	11′-0″	10′-6″	8′-0″	7′-0″	6′-0″
100′-0″	15′-6″	15′-0″	13′-0″	11′-0″	9′-0″	7′-6″
150′-0″	.....	.....	17′-0″	16′-0″	14′-0″	12′-0″
200′-0″	.....	.....	20′-0″	19′-0″	16′-6″	16′-0″

FIG. 4—SWITCH LENGTHS REQUIRED FOR CURVES

The point of the switch is taken as ¼ in. and the heel distance as 4 in. With a 36-in. wheelbase and radius of 200 ft. the angle subtended by the base of the truck is 51 min. and 34 sec., which corresponds to a switch point between 19 and 20 ft. long and therefore is recorded in the third table as 20 ft.

encountered or for each switch traversed, the power lost from this cause will be proportional to the number of accelerations.

It is clear that these factors all have an important bearing on the total drawbar pull of the locomotive and consequently on the total power required to move the train from one terminal to another; and it is evident that, if all things are duly considered, the drawbar pull can be greatly decreased by a proper design of trackwork.

In Fig. 1 it is seen that the equivalent grade due to curve resistance is a big item. In order to reduce this to a minimum the gage of the track on the curves must be properly widened. At this point, however, both the width of tires and the weight of rails must be taken into consideration. If we are to reduce the resistance to a minimum the gage must be properly widened (see Fig. 3).

It has been said already that to keep the resistance due to velocity at the minimum and the haulage power bills also, the train must be kept at the same velocity, or as nearly so as possible, from terminal to terminal. To accomplish this the switches over which the train operates, as well as the curves, must be so designed that the train may safely pass over them at its rated velocity.

In order that this may be done the frog, the switch radius and the switch points must have certain definite relations. An illustration of this is shown in Fig. 4. For example, the angle subtended at the center of the curve by the wheelbase of the truck should remain constant from the point of curvature to the point of tangency. In order that the truck shall be drawn around the curve with a uniform drawbar pull the angle which the switch rail makes with the straight rail must be maintained equal to the angle subtended at the center of the curve by the truck, thus maintaining a uniform drawbar pull from the moment the truck is fully on the switch point until it has rounded the curve and is again on straight track. By designing switches with this point in view it is possible that the rolling stock will receive but one shock, due to impact, when the truck hits the switch rail, whereas if this angle is not kept constant, each change in it means an additional shock or impact.

Every Track Detail Must Match Equipment

All the relations as above set forth may not be theoretically correct in the last analysis, but they are sufficiently accurate to indicate that if the best results are to be obtained relations between the switch radius, length of switch points, frogs, weight of rail, wheelbase and width of tires cannot be chosen arbitrarily but must be determined by the use of a series of data and tabulations which will guide the designer accurately in the proper choice of the various factors entering into the design.

The foregoing theory and method of carrying out these designs is meant only as an illustration of what is required. This is a long, complicated and very much involved subject, however, which requires not only theoretical formulas and data but also requires many empirical data which can be obtained only by making proper dynamometer and other tests on moving trains.

Provision for Keeping Shaft Sump Clean Of Fallen Coal at Minimum Cost

By George Bowker
West Frankfort, Ill.

At ALL coal mines using self-dumping cages part of the coal falls down the shaft, some being caught at the ground landing and the rest going back down into the sump. The quantity thus falling varies from a few tons to several carloads per day, depending upon the tonnage and speed of hoisting. At a mine with which I am acquainted the quantity of coal falling back into the sump was so great that hoisting frequently had to be suspended until the cage seats could be cleaned in order to allow the cages to land.

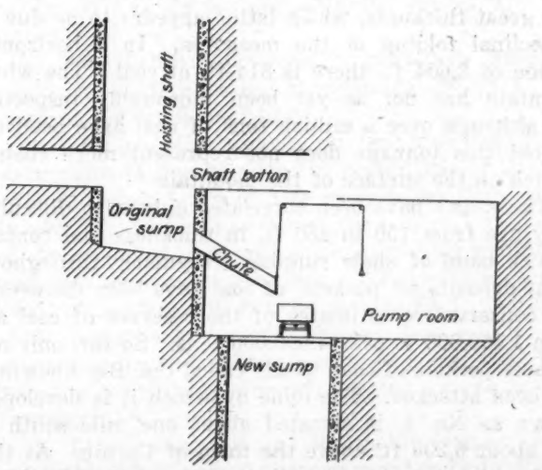
This was not the only trouble, for after the day's hoisting was completed a night shift of six to eight men would have to be employed to clean out the sump so as to be ready for the next day. It can be readily seen that this was very expensive. To avoid this expense the management devised a method that entirely eliminated the delay during the hoisting period and cut down the number of men required to clean the sump from eight to two. This saves the wages of six men at $7.25 per day, which would aggregate a large sum of money at the end of a year.

Description of Plan Adopted

The method employed at this mine is as follows: A roadway was driven in the shaft pillar at right angles to the empty run-around. A slope into the bottom was started out of this roadway at right angles to the empty-car track and dipping as it progressed toward the shaft at a slope of 1 in 4. This was driven till the foot of the incline was in line with the end wall of the shaft. The slope was not driven directly under the shaft but a short distance to one side of it. A large sump was then dug about 12x18 ft. and 20 ft. deep.

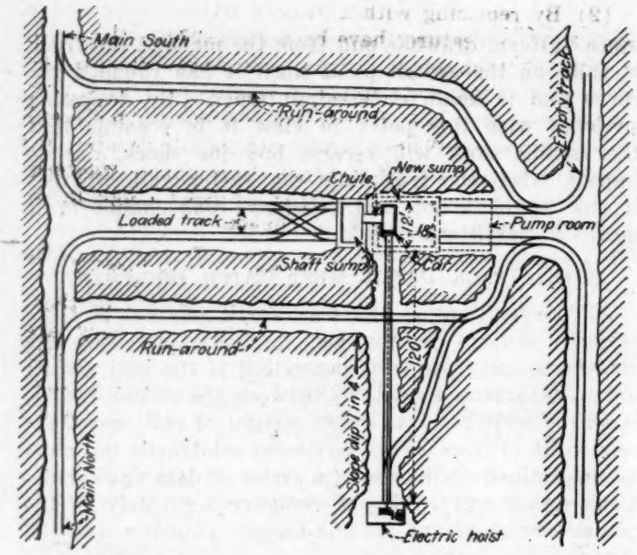
When the sump was finished it was lined with concrete, 30-lb. rails being placed across it upon which a floor was laid. Connection was then made between the original and the new sump and an iron chute built in the concrete wall that entirely separates the two sumps. A pumproom is built alongside the new sump. Here a 6x6½-in. triplex pump handles the water. All the coal falling back during the day is stored in the original sump and chute.

When the sump is to be cleaned a car is placed under the chute and the iron door that closes it is raised by pulling on a lever, allowing the coal to slide out into the car. At the head of the incline an electric hoist is installed to haul the cars up the incline. All the water made in the shaft is collected in a water ring and piped into the new sump, making the shaft bottom completely



SLOPE TO SUMP GIVES ACCESS TO FALLEN COAL

Much coal falls from self-acting shaft dump. Some falls on the tracks of the landing but more into the sump, where it can be reached only with difficulty. An incline has been driven low enough at one end for the coal to be passed through a chute into a car stationed at the track terminal.



TWO SUMPS ARE PROVIDED AT THIS MINE

One, the upper sump, is for coal, and the other, the lower, for water. The sump is, therefore, easily cleaned, and the water never fails to have adequate storage. This arrangement reduced the cleaning force to one-fourth of that formerly employed. The pumps at all times draw their water from a relatively clean sump.

dry. Though this may seem expensive, yet when we consider the quantity of coal falling back in a day's time from an output that runs around 5,000 tons and when we keep in mind the number of men required to clean the sump it will be seen that the improvement will soon pay for itself. By using the electric hoist the coal can be hauled up the incline during working hours and spotted in a convenient place so that the locomotive can take it to the bottom, from which it can be hoisted during the day.

Seam of Coal in Canada 200 Ft. Thick Yet Operation Was for a Time Abandoned

"AT COAL MOUNTAIN, where the Corbin Coal & Coke Co. is mining," said Robert Strachan, in a paper entitled "Coal Mining in British Columbia," presented to the Canadian Institute of Mining and Metallurgy and reported in the *Monthly Bulletin* of the society, "the seams are standing almost perpendicular and attain great thickness, which latter appears to be due to monoclinal folding of the measures. In a horizontal section of 2,604 ft. there is 814 ft. of coal. The whole mountain has not as yet been thoroughly inspected, and although over a million tons of coal have been extracted this tonnage does not represent more than a scratch on the surface of the mountain.

"The seams have been correlated only with difficulty. They are from 150 to 250 ft. in thickness and contain a thick band of shale running irregularly throughout. Great deposits or 'pockets' of coal have been discovered and conservative estimates of the reserves of coal are from 1,500,000 to over 4,000,000 tons. So far, only one of these pockets of coal, locally called the 'Big Showing,' has been attacked. The mine by which it is developed, known as No. 3, is situated about one mile south of and about 6,200 ft. above the town of Corbin. At this point a cut reveals a synclinal basin about 370 ft. in width at the center of which the coal is 200 ft. thick. This deposit is in a direct line with the mines at Corbin and although the geological relations have not as yet been fully established, drillholes and open cuts have indicated that this 'pocket' is a continuation of the Corbin coal measures.

"The method of mining these large bodies of coal consists of first stripping the surface *débris* and coal blossom and then loading the coal directly by steam shovels into railroad cars. This system did not prove as economical as might have been expected, and much coal was lost in stripping. Little opportunity was afforded for picking out foreign matter or for selecting any portion of the coal being mined, and this mine or quarry later was temporarily abandoned. The operations might have been conducted on a less spectacular scale with more benches and employing either chutes or retarding conveyors to take the coal down the hill in small cars. Had this been done the expensive railway constructed might have been dispensed with. It also would have made it possible to eliminate the extremely fine coal found near the crop as well as the foreign matter, thus providing a more suitable coal for the market.

"In addition to No. 3 mine or the 'Big Showing,' three other mines, Nos. 4, 5 and 6, have been opened convenient to the railway at Corbin. All of these are underground workings. No. 4 mine is worked on a vertical seam of coal approximately 150 ft. thick. No. 5 mine is worked under similar conditions. The No. 6 seam, the most recently opened, was found to be 400 ft. thick at an elevation of 5,315 ft. A level driven on this seam 75 ft. higher proved the thickness of coal to be 375 ft., and another level yet 66 ft. higher proved 150 ft. of coal across the seam.

Use Modification of Room and Pillar Method

"The methods followed in working the coal have been modifications of room and pillar adapted to vertical seams. The pillars were subdivided into portions so small that they were crushed. Thus the space formerly occupied by the pillars was filled by a lowering of the roof. The coal was drawn from the chutes until this rock or waste showed up, then the chute was closed and similar operations commenced on another series of pillars outbye.

"With the opening of the large seam at No. 6 mine a new method of working is to be followed. The seam will be blocked out in sections and mined by slicing. Planks or lagging will be laid down as a floor for the first slice, using this floor as a roof for the next slice and allowing the roof to cave. These floors will prevent foreign material from mixing with the slice, or lift, of coal being taken.

The coals mined at Corbin have been found to be much higher in fixed carbon and lower in volatile than the general run of coals in the district. They are more like the seams at Morrissey than like those at either Coal Creek or Michel. The following analysis is typical:

	Per Cent		Per Cent
Moisture	0.75	Fixed carbon	69.00
Volatile matter	22.75	Ash	7.50

The various seams which have been mined at Corbin at one time or another are:

Seam No.	Thickness in Feet	Seam No.	Thickness in Feet
1	170	4	200
2	12	5	12
3	200	6	400

The coal is dark, glossy and friable. The weakness of the coal is illustrated by the fact that the pillars will run of their own weight or when assisted by roof pressure.

Why Series Haulage Motors Flash And How to Cure That Fault

Conditions in Design, Commutators, Brushholders, Carbons, Windings and Operation May So Affect Commutation as to Cause It

FLASHING of haulage motors, also commonly known as bucking or blowing, is primarily caused by poor commutation, which results in a sudden breakdown of the insulation over the face of the commutator from the brushholder to the motor frame or ground. As a result there is a sudden rush of heavy current which will either open the circuit breaker, or hang on as an arc, and badly burn the parts short-circuited.

The results of flashing are varied. Sometimes the motor is so badly damaged that it is inoperative. In this case the motor must be overhauled, armature windings repaired, commutator cleaned up, brushholders and wiring-around-frame put in good condition. When the short-circuit is immediately cleared the motor generally can be continued in service to finish its run, but should be reported as defective and given a careful inspection for any damaged parts that need attention.

In Table I is given a detailed layout of the various conditions that affect commutation of a haulage motor which, in turn, influences its flashing.

TABLE I—CONDITIONS THAT TEND TO PRODUCE FLASHING

Design	Non-commutating pole type	
	Sensitive neutral	
	High voltage between commutator bars	
Commutators	Rough face	High bars
		Low bars
		Loose bars
		Flat spots
	Poor surface condition	Poor undercutting of mica
		Sharp edges on commutator bars
		Sharp corners on commutator bars
		Dirty commutators
Brushholders	Lack of spring tension	Broken spring
		Weak spring pressure
		Pressure finger sticking
		Worn mechanism
	Incorrect setting	Too far from commutator surface
		Incorrect spacing between brushholders
		Out of alignment with pole
	Worn carbon box	
	Loose in clamping block	
	Too small clearances to ground	
Carbons	Inferior grades	
	Length	Too long
		Too short
	Clearance	Loose in carbon box
		Tight in carbon box
Windings	Broken	
	Wiring-around frame	Loose brushholder connection
	Armature	Wrong connection
	Main field	Short circuited coil
		Reversed coil
		Field control—wrong connection
		Design of coil bobbin or case
	Commutating-pole field	Short circuited coil
		Reversed coil
Operation	Sudden voltage changes	Faulty control
		Rapid acceleration
	High-speed running	Plugging motors
	High trolley voltage	Heavy operation
	Overheating of motors	Breaks in third rail
	Loose or worn bearings	Too much end play
		Too much side play
	Rough track	
	Flat wheels	

Design.—Questions of design are best handled by co-operating with reputable manufacturers. Nothing pleases a manufacturer more than to have the operator of electrical equipment take up questions of design with the designers. The manufacturer who can say that the user has given him many points of advantage which have been incorporated into his machine has a real argument for serving the industry.

(1) The design cannot be changed without practically rebuilding the motor or

(2) By replacing with a modern motor in which the objectionable features have been eliminated.

Commutators.—Care of the commutator is highly important. The commutator is what makes the direct-current machine. Commutator troubles soon develop into serious breakdowns, consequences which affect the operation of the whole machine. Important points are:

(1) The commutators should be tight and have a smooth, highly polished clean face.

(2) If loose, the commutator should be heated and the ringnut or clamping bolts drawn up tight.

(3) All high or low bars and flat spots should be ground smooth if possible; otherwise the armature should be put in a lathe and turned.

(4) The mica should be undercut to a depth of $\frac{3}{32}$-in., and all particles of mica thoroughly cleaned out of the slot.

(5) If the sharp edges left on the copper segments when undercutting are rounded off, this will improve conditions.

(6) The corners at the outer edge of the commutator face should be rounded off with approximately $\frac{1}{16}$-in. radius, and those at the inner edge of the commutator face with approximately $\frac{1}{8}$-in. radius.

(7) The commutator face should be kept free from oil and dust.

Brushholders.—The brushholders may cause the best grade of brush to work poorly. Vibration, chattering, etc., frequently are caused by improper adjustment of the brushholders. The salient points on brushholders are:

(1) On the average, the tension on carbon brushes should be kept at approximately 5 to 7 lb. per square inch.

(2) Broken pressure springs should be replaced by new ones.

(3) When the spring pressure is weak, wind up the tension spring.

(4) If the mechanism tends to stick, a little signal oil on moving parts may relieve this; if not, take the brushholder apart, clean and machine parts that are tight.

(5) When parts are badly worn, allowing the contact tip to rest on top of the carbon box, replace the worn parts by new pieces.

(6) Brushholders should be set approximately $\frac{1}{16}$-in. from the face of the commutator, and the sides of the box should line up parallel with the commutator segments.

(7) The distance between brushholders measured around the surface of the commutator should be one-fourth of the number of bars.

(8) With but few exceptions, the brushholder carbon box should line up with the center line of the pole.

(9) A carbon box which is worn wider than normal will allow the brush to swing off the neutral. In double-end operation due to uneven wear in running in different directions, the contact area also is considerably reduced. New brushholders will remedy trouble from this cause.

(10) Brushholders should have at least $\frac{5}{8}$-in. to $\frac{3}{4}$-in. clearance to ground. When clearance is less than $\frac{5}{8}$-in., insulating arc shields, properly located, can be used to advantage.

(11) Lining the inside of the motor frames around the brushholders, and at the commutator front V-ring, with insulating material tends to reduce flashing at these points.

Carbon Brushes.—Low-grade carbons are expensive

at any price. Cases have been known where a good brush would last years while a poor brush would cause more damage to the commutator in a day than the proper brush would cause in two or three years. Due consideration must be given to the following points:

(1) Poor commutation can sometimes be greatly improved by changing to a higher grade of carbon brush.

(2) If the carbons are too long, the resultant pressure from the brushholder contact tip is not on the top of the carbons, and the effective force on top of the carbons is reduced. For the more recently designed brushholders, carbons when new, should be 2 in. long.

(3) When the carbons are too short, the pressure on top of carbon is reduced, due to the design of the spring, and sometimes when the carbon is very short it is entirely out of range of the spring, which strikes the side of the box. These carbons should be replaced by new ones.

(4) Loose carbons cause vibration and tend toward poor commutation. Use new carbons with 0.006 to 0.008 in. initial clearance.

(5) Tight carbons stick in the boxes and the contact at the surface of the commutator is broken. This condition can be remedied by rubbing the sides of the carbons on sandpaper.

(6) Broken carbons should be replaced.

Windings.—The windings should be kept clean of all kinds of dust, dirt and oil. This does not mean the mere cleaning of the other surfaces of the winding. The gradual accumulation of carbon dust in a winding is sure to cause trouble. Machines which have broken down because of insulation failure show a surprising accumulation of dust and dirt in the windings, this being the more surprising when the machine is known to have been operated under the best of conditions. The ventilating air currents passing through the winding are laden with small particles of carbon and copper dust.

Summarizing the important points on proper care of the winding they are:

(1) Wiring around frame leads to brushholders, if broken or loose, so as to swing against the frame, should be repaired and securely fastened.

(2) In connecting the leads to the commutator it sometimes happens that the throw of the lead is either too great or too short, which has the same effect as shifting the brushholders.

(3) Short-circuited main field coils produce a weak field and result in poor commutation; this condition further has a damping effect on the field that opposes sudden field changes with same results.

(4) A reversed main field coil produces a weak field and consequent poor commutation. Check the polarity and reconnect.

(5) Field control motors with coils that have a number of turns arranged to be cut out have been known to be so connected that the weak field is used in place of the strong one. Check connections.

(6) Where the field coil is encased in a metal box to make it water and fireproof, this box acts as a damper and opposes sudden field changes. Sometimes this is remedied by making a saw-cut in the box and filling the opening with a hard insulating material.

(7) A short-circuited commutating pole-coil produces a weaker commutating field, which results in poorer commutation.

(8) A reversed commutating pole-coil weakens the commutating field and results in poorer commutation. Check the polarity of the coils.

Operation.—Ignorance of the proper care and operation of electrical machinery sometimes is dangerous and always is uneconomical from a maintenance and power point of view. Several suggestions for bettering conditions may be grouped as follows:

(1) Faulty control operation that allows sudden voltage changes at motor terminals can be remedied by checking the control circuit.

(2) Rapid acceleration can be remedied by issuing instructions to the motor-men or by the use of an automotioneer or automatic control.

(3) Suddenly reversing the current through the motors to make a quick stop, commonly known as plugging the motors, tends to cause flashing. A campaign of education of the motormen is the best remedy.

(4) Heavy service with a number of cars pulling on the line at the same time, sometimes causes sudden voltage changes, resulting in flashing. This condition might be helped somewhat by a rearrangement of the schedule.

(5) Troubles caused by breaks in the trolley at crossovers can best be reduced by passing over this special construction work with power off.

(6) Where high-speed running (ordinarily downgrade) causes flashing, the motorman should keep within a definite maximum speed.

(7) If high trolley voltage—600 to 650—is used on motors designed for 500 volts, motor details must be kept in good condition.

(8) When the motors are overworked and considerable heat and gas (from insulating compounds of newly repaired windings) are present inside the motors, these tend to prolong a flashover, and can be relieved by operating the motors with the commutator covers off.

(9) Loose or worn bearings allow considerable vibration, which tends to lift the carbons from the commutator, and cause flashing.

(10) Rough track has an effect like loose bearings.

(11) Cars with flat wheels produce the same result as running over a rough track. Defective wheels should be made round by turning or grinding or by the use of an emery insert brake-shoe.

U. M. W. Stubbornly Oppose Labor-Saving Machinery in Pennsylvania Mines

Opposition of the United Mine Workers to the introduction of labor-saving machinery in soft-coal mines is so stubborn that the operators of the central Pennsylvania field felt that they had to make a plea to the U. S. Coal Commission to devise means for safeguarding the union mines in their efforts to keep abreast of present day mining methods.

One glaring instance was cited where, after the operator had obtained a coal-cutting machine and offered to have it tried out, then came to an agreement with the men as to pay rates for those operating the machine, the men called a strike, flatly refusing to countenance the cutting machine in the mine, and forced the operator to remove it.

The central Pennsylvania operators pointed out to the Commission that machines have been allowed in the unionized mines of their district only after their introduction in open-shop mines made competition so severe that it would have been impossible to attempt to go on mining coal with only the old-fashioned pick method, which is far less efficient and economical than machine cutting of coal.

The operators frankly informed the Commission that in their opinion if the coal-mining industry was 100 per cent unionized—as the United Mine Workers have proposed as a panacea for all the ills of the coal industry—there never would be another machine introduced into a coal mine in the country. This would mean, of course, that it would cost much more to produce the coal, and it necessarily would sell for a higher price to the public.

Creosoting Experience at Two Small Mining Plants

Pressure-Treated Timber as Good as New After Thirteen Years—Untreated Sets Replaced Three to Five Times — Brush-Coated Timber Still Sound After Four Years — Now Using Dipped Timber

BY THOMAS R. CLARK
Clark Coal & Coke Co., Peoria, Ill.

OBTAINING the proper kind of timber for coal mines each year becomes an increasingly difficult problem for the operator. Only the strongest and best woods will perform the service demanded and, therefore, the buyer is limited in his search for timber. The conditions under which the timbers are used are the worst imaginable, and it is remarkable that they last as long as they do.

In this article reference will be made solely to treatment with creosote. In the Peoria district of Illinois practically no attempt has been made to apply preservatives to timber, and the company with which I am identified is a pioneer in this respect.

Back in 1910 a carload of 6- and 8-ft. pressure-treated crossbars and lags was purchased. They were used to timber a main haulage road; today practically every set is still standing and in good condition. The treated wood is still so hard that it is almost impossible to stick a knife blade into it. Several sets of timbers erected in 1910 have been discarded but practically in every instance in which the timber has been replaced the necessity for its replacement may be ascribed to excessive weight. The main haulage road was not timbered throughout its entire length with creosoted timbers because the supply was exhausted, and untreated timbers had to be used to finish the job.

CREOSOTING DOUBLED FIRST COST OF TIMBER

The untreated timbers have had to be renewed three and, in some cases, four and five times. At the time the creosoted timbers were put in the cost of creosoting amounted to just about what the untreated timbers cost, so it can readily be seen that if these timbers stood twice as long as an untreated set, they had paid for themselves in the material saving alone. However, the big expense in timbering is labor, not only of framing and putting up the timber but handling the dirt and rock that often falls when an old set of timbers is replaced with a new one; thus the economy is many times that of the actual material saved.

Four years ago the lasting qualities of these timbers were so apparent, and investigation proved the results to be so satisfying that it was decided to put in more creosoted timber. It was found that the pressure process was an expensive one; therefore we were forced to try other methods. A few barrels of creosote oil were bought and applied to about twenty sets of timbers that were going into a place where it was necessary to renew timber about every two or three years. A liberal two-coat brush treatment was given to timber that had been barked and seasoned.

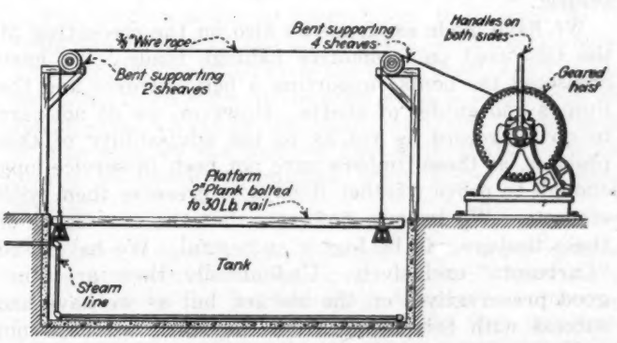
Today these timbers are still standing and show no signs of decay; therefore it will be seen that even so slight a treatment as brushing pays. The brush treatment, however, does not always give the desired penetration, and it also is expensive to apply. It seemed to us that a dip of some kind would be the logical method of overcoming these difficulties, and, accordingly two years ago we built a dipping plant at our Logan mine, which is located at Hanna City. On account of a limited appropriation for this work Fred Waters, the superintendent at that mine, and I, decided that simplicity must be the first consideration.

We first built a cement tank 5x18 ft. in horizontal dimensions and 4 ft. deep; to this was connected a sloping drainage platform of concrete in which were embedded short pieces of upstanding ½-in. iron, so that the wet timber when placed on the drainage table would not roll back into the tank. In the bottom of the tank several lengths of 1-in. pipe were laid and connected together into one line by return elbows. This line was attached to an exhaust-steam line so that we could heat the creosote. This is all the equipment that was used except that an inexpensive building was put up over the tank to keep out the rain.

PUT TIMBER IN HOT CREOSOTE AND LET IT COOL

The expensive pressure process has as one of its fundamentals the theory that using first hot and then cold creosote will afford the maximum penetration. We decided that, on account of the small quantity of timber which we expected to creosote and the fact that were we not hurried in doing this work, we could raise the temperature of the creosote to a boiling point or near to it and allow the timber to stay immersed until the temperature had cooled down to that of the atmosphere or somewhere near it.

At the Logan mine there was a part of the day when coal was not being hoisted and top men were not busy, and therefore it cost us practically nothing for the labor of creosoting by doing a little of it every day. We kept a two weeks' supply of timber on hand. Consequently the creosote was given an opportunity to soak in thoroughly. This eliminated one of the objections to creosoting timber, namely, that timber men dislike



CONCRETE TANK FOR DIPPING TIMBER IN CREOSOTE

Timber sticks are lowered on a platform into creosote, heated by exhaust steam which is passed through pipes in the bottom of the tank. The creosote is allowed to cool. Thus the stick is given the advantage of both hot and cold treatment. The timber finally is lifted by the hoist and rolled on the draining table, where the free creosote runs off and the timber dries. This table is not shown in the illustration.

handling timber when it is still wet and slimy. The results at this mine were so gratifying that we decided last winter to install a similar plant at Empire No. 2 Mine.

This is a larger mine than that at Hanna City, and to meet those conditions the designs of the plant were changed somewhat and advantage was taken of experience at the Hanna Mine. The same kind of a tank was built, but drip platforms were placed on both sides so that timbers could be handled on either side and more than one run could be made per day. A platform was designed so that the timbers could be lowered into the creosote and lifted out again without having to resort to the laborious and time-consuming process of fishing out the timbers with a pair of hooked poles.

Averts Burns from Splashing of Creosote

This also prevented the splashing of creosote on the men who were handling the timber. Creosote burns the skin and causes irritation for several days after the burn is received. The hoist which operates this platform is shown in the accompanying illustration. S. H. Dodd and Benjamin Wyss, superintendent and master mechanic, respectively, designed and built this hoist.

The plant at Hanna City cost less than $500 to erect and that at Empire No. 2 cost about $850. The cost of the creosote itself is about the only expense we have had to meet, for the work can be done at odd moments. We have found that once in a while we have to go to the expense of repiling the timber, but this is due to the fact that we have a limited amount of top space, and any mine with adequate timber storage room would not have all this trouble.

Undoubtedly the question will be asked, Do you creosote all the timbers? The answer is, No. We use creosoted timbers only on main entries and cross entries where the timber has to be maintained for four years or more. Good white-oak timber will stand for four years if properly placed, and it would not be of any advantage to put in the more expensive creosoted timbers for this length of time.

Some Woods Take More Creosote Than Others

Creosote does not work equally well on all woods. White oak and other similarly close-grained woods do not absorb much creosote. Red oak and black oak, we have found soak up creosote successfully. To anyone who is interested in what woods will take creosote, let it be said that nearly all the manufacturers of wood preservatives have bulletins and literature on the subject.

We have made experiments also on the creosoting of the ties used on locomotive haulage roads. We have creosoted the bents supporting a belt conveyor and the linings and guides of shafts. However, we do not care to go on record as yet as to the advisability of this practice, as these timbers have not been in service long enough to prove whether it pays to preserve them with creosote. We believe, however, that the creosoting of these timbers will be highly successful. We have used "Carbosota" exclusively. Undoubtedly, there are other good preservatives on the market, but as we have had success with this brand from the start, we have not tried any other.

Though creosoted timbers are more expensive in first cost than untreated timbers, still they pay such big dividends that they ought to come into more general use. However, even if creosoting or any other method of preserving wood only "showed an even break" on the ledger, it behooves all of us to make use of them because preservation conserves one of our greatest national resources and the conserving of national resources is one of the greatest patriotic services any good citizen can render.

Well-Placed Shots in Upraise Save Timber

By J. W. Powell
Charleston, W. Va.

In the issue of *Coal Age* of May 4, 1922, appeared an article entitled "Driving an Upraise Shaft." This article described the method in detail with the help of drawings which showed sectional elevations of the upraise shaft and also a general plan of the shaft and details of the raise.

Though this article was published in May it was not until Aug. 15, 1922, that the work of upraising was commenced. The job which was done by contract, was performed precisely in the manner described in the preceding article, with one exception, that an additional 2-in. pipe was carried up the manway compartment to serve as a speaking tube. This was found to work most satisfactorily. A 15-ft. length of discarded 2-in. steam hose was affixed to the upper end of the speaking tube, which was coiled up when first placed and then uncoiled as the face advanced until there was room for another 10-ft. length of steel pipe.

The main pipe line was then extended up to the platform, and an extension hose attached for the next 10 ft. of advance. This installation made it unnecessary for the workmen upraising the shaft to climb up and down to the platform when they wished to communicate with the men below, for the pipe was flexible and could be extended as needed. Thus much time was saved.

Herewith will be found sketches of the system of drilling and blasting which was employed, showing the number of holes and their position. From thirty-five

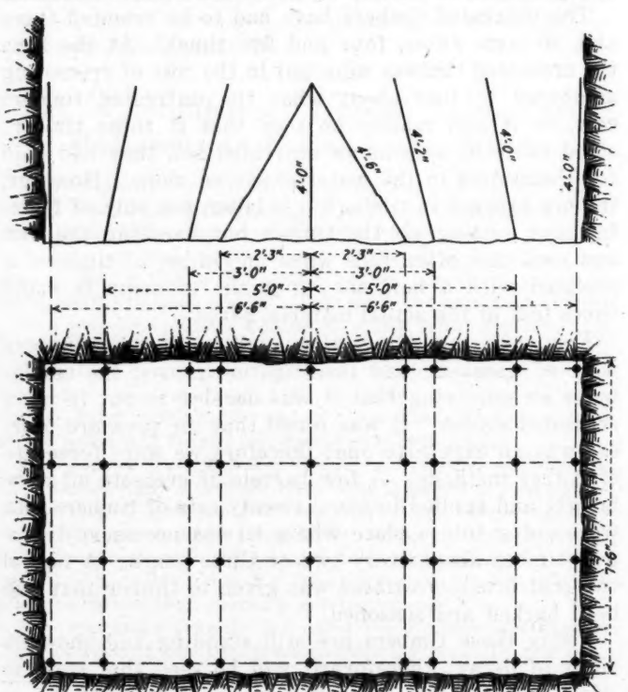


FIG. 1—BLASTING DIAGRAM, ORIGINAL SYSTEM
As performed at the start the first shot was placed in the center of the shaft. The others blew straight downward at the center, and the rock fell, as propelled by the explosive, onto the timbers, frequently displacing them.

to forty-four holes were drilled to a round, and the number of holes was governed by the nature of the rock being penetrated.

When the shaft raise was commenced the system used was that shown in Fig. 1, but this did not work quite satisfactorily, principally on account of the breaking holes blasting down on cribbing timbers and thus tending to knock them out of line. The system shown in Fig. 2 then was devised, and this worked well and, in consequence was used throughout the entire work.

It readily will be seen that by blasting the cut shots on the left rib, and then the other rows of holes in succession, all material was blasted away from the timber below and all the violence was exerted against the left-hand rib of the shaft. Thus was eliminated the trouble that had been previously experienced from shots knocking the cribbing timbers out of alignment.

These holes were blasted in order as follows: Nos. 1, 2 and 3, using from 4 to 6 sticks of ⅞-in. 60 per cent gelatine dynamite, were fired in succession with straight first- and second-delay fuses; then Nos. 4, 5 and 6, using from 5 to 7 sticks of ⅞-in. 60 per cent gelatine dynamite. The lift was then completed by firing all holes in rows Nos. 7, 8, 9 and 10; Nos. 7 and 8 being fired by straight fuses and Nos. 9 and 10 with first-delay fuses.

By this method the shots in each hole had a good chance to break the rock, as care always was taken to see that all holes of the previous round were broken completely to their far ends before the next round was charged. Sometimes it was necessary to charge some of the holes the second time to accomplish this.

It was necessary to drill this large number of holes in order to break up the rock into small pieces, so that they would not block in the rock compartment, which was kept full, only enough being drawn from time to time to clean the raise to a point about 7 ft. below the face. It was predicted by a number of mining men that the job would be troubled by the blocking of the rock compartment.

Although the shaft was raised a distance of 200-ft. vertically, however, the rock never once blocked. This was due to the fact that the rock was blasted into small pieces, far smaller than was expected. Poke holes had been provided every 30 ft. in the partition between the rock compartment and the manway, so that in case the rock should block, the flow of débris readily could be started. However, these poke holes never were used.

Shaft Readily Plumbed on Points Below

The following method was used in plumbing the shaft: Four stations were placed in the bottom rock of the coal seam, 4 in. from each corner of the manway and hoistway compartments. These stations were located on plugs of hardwood, driven into 1¾-in. holes drilled 10 in. into bottom rock with a jack hammer; points were located on these plugs and all plumbing was carried to these points. The alignment was such that the upraise met the main shaft sinking from above without error.

This raise shaft, 7x14-ft. in the clear, was raised a distance of 200 ft. in ten weeks, working two shifts of ten hours each. This arrangement of working time was found more satisfactory than three shifts of eight hours, as there was only one change of shifts instead of two. This effected quite a saving in the time lost in the changing of shifts and was entirely satisfactory to the men, who preferred it to working the usual three eight-hour shifts.

In order to reduce to a minimum the chances of accident from loose pieces of rock falling from above, which is one of the chief hazards in this class of work, the men were equipped with steel helmets which could be bought for 20c. each in the company store. This headgear was uncomfortable at first, but the men soon got used to it and would not attempt to go to the face of the upraise without it. It is necessary after each blast to climb the ladderway to the face and trim down all loose and hanging pieces of rock, and as this material is directly above the workman his head has to be safeguarded.

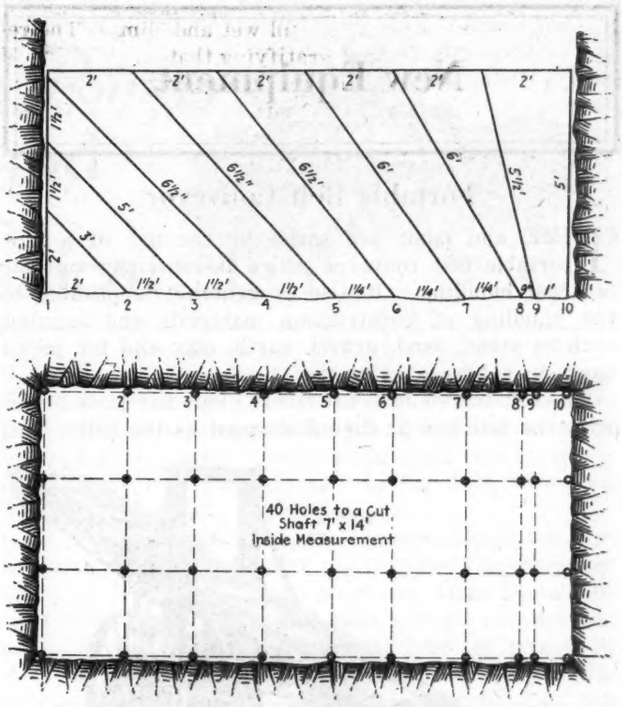


FIG. 2—BLASTING SYSTEM AS FINALLY ADOPTED
By starting the lift on the left and shooting toward one side the rock struck the side of the shaft and so did little damage to the timber beneath. At the same time it was broken so fine that it did not block in the battery.

This was accomplished by the use of the helmet, and the men found they could trim down the loose rock with short and long scaling bars in comparative safety. Though the steel helmets showed numerous indentations, not a man was hurt when using one of them, the only accident occurring when one of the men undertook to go to the face without wearing his helmet. In this instance a small piece of rock fell, causing a slight scalp wound, which laid him off for the balance of the shift.

The shaft was raised from below to a point 23 ft. from the bottom of the shaft being sunk from above. After the distance between the main shaft and the upraise had been reduced the men were withdrawn from the upraise whenever the main shaft was blasted and in like manner the men in the main shaft were removed whenever the upraise shaft below was being blasted.

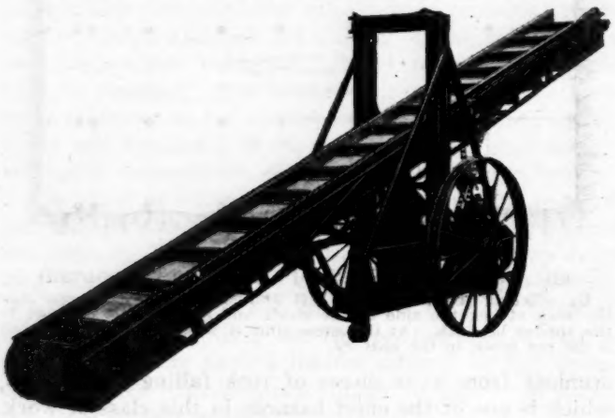
Herbert Hoover has been elected an honorary member of the Czechoslovak Engineers and Architects Association, it is announced by the Federated American Engineering Societies, of which Mr. Hoover was the first president. The honor was conferred at the annual conference of the association held recently at Kosice in recognition of "merit in engineering science and practice and good rendered to our people." Mr. Hoover was chairman of the Committee on Elimination of Waste in Industry, whose report has been translated by the Government of Czechoslovakia and distributed to industries and educational institutions there.

New Equipment

Portable Belt Conveyor

TIME and labor are saved by the use of a new portable belt conveyor which is especially suitable for coal handling. It also is generally applicable to the handling of construction materials and supplies such as stone, sand, gravel, earth, clay and for piling bagged or boxed materials.

The belt travels on a flat track. This flat track moves with the belt and at the same speed as the belt. This



MATERIAL HANDLING CONVEYOR

The track consists of a link-belt chain with crosspieces which may be adjusted to suitable intervals. Flights and belt move at the same speed and there is no friction under the belt.

prevents friction on the belt and insures a flat belt surface. Power-driven brushes prevent any accumulation of material on the belt surface.

This conveyor is manufactured by the Maroa Manufacturing Co., Maroa, Ill., and can be had with several different types of trucks. The equipment can be obtained with or without an electric-motor or gasoline-engine power drive.

New Development in Material Transporting

THE Chisholm-Moore Manufacturing Co., of Cleveland, Ohio, manufacturers of the Cyclone chain hoists, having recently become the sole distributors of the Atlas carryall truck system, have issued a new circular and complete book of instructions which describe the construction and installation of the system.

These new booklets bring out some interesting details with respect to this system of overhead conveying.

The labor of routing and transporting material in a shop, stockroom or warehouse was long age recognized as one of the principal items of cost. Overhead conveying has done a great deal in cutting costs, speeding up transportation and doing away with the trucking congestion of floors. It also eliminates most of the ordinary accidents caused by factory transportation and prevents wear and replacements of floors necessitated by trucks.

The truck of the Atlas System is suspended from heavy steel hangers, spaced at intervals of 2 to 4 ft., depending upon the load to be carried. In some cases it does not require a superstructure, as it may be suspended from timbers, ceilings, joists or steel trusses by brackets made especially for that purpose. It may readily be suspended from crossbeams in concrete ceilings.

The switching system permits the use of two- or three-way switches. The tongue is pivoted at one end and has steel rollers on the other end which move on a machined surface and drop into a groove, bringing the tongue into perfect alignment with the stationary track.

Trolleys are made in several sizes, ranging from one-half ton to two-ton capacity and are so constructed as to require a low head-room. The trolley frames are so designed that both ends act as bumpers and allow two or more trolleys to operate on the same track without the trolley wheels touching. Trolley wheels have chilled face surfaces and are equipped with Hyatt roller bearings in dustproof housings.

A most novel innovation is the automatic track gap filler used wherever the track passes through a doorway.

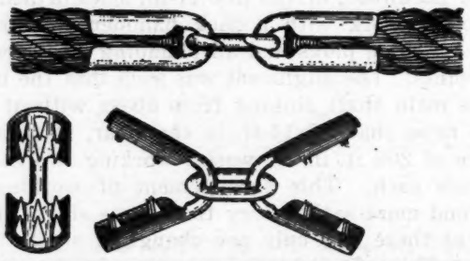
Eliminating the Time-Consuming Splice

TIME is a leading element in tonnage. A broken rope means time lost, and time lost means standing cars, an idle tipple and loss of morale. A quick repair and money is saved. To stop a slope for the splicing of a cable is to make a bad tonnage report and a high cost record. Charles N. Finton, of Lykens, Pa., has a splice that seems likely to cut out such delays.

It has no rivets or other devices requiring special tools, and it has no loose or detachable parts to get lost, or be forgotten. It is said to hold the ends of the rope firmly without mutilating the strands or weakening the rope, and anyone can install it. It is so simple that a description will help but little to make its method of operation any plainer. The free end of the rope is bound with butcher twine or other suitable binder.

A socket of suitable size is kept on hand, and the rope is inserted in the open jaws with the wrapped end close to the shank. The jaws are forced together closing about the rope, the coniform teeth penetrating without severing or breaking the strands or fibers, which merely part and entwine the teeth. When using a solid link it is slipped over the shank before closing.

The diameter of the socket when closed decreases as it extends away from the shank, the tapering of the jaws being such that its diameter when closed about the rope is equal to, or less than, the diameter of the rope, thus assuring an easy passage over the pulleys. No tool is needed except a hammer. No dies or swages are necessary. When the rope breaks the socket is taken off by burning out the old rope strands and prying the socket loose.



SOCKET WHICH COUPLES UP A BROKEN ROPE

The socketed portion is of smaller diameter than the rope. A piece of twine and a hammer are all the equipment needed to make the rope ready for use. Only a few men can splice a rope. Any rope rider or roadman can fix this socket and do the work alone and in far less time than any man, however expert, would take to splice it.

Renewing and Lubricating Trolley Wheels

IT MAY be valuable to some of the readers of *Coal Age* to know that the common practice around the mines to replace a worn-out trolley wheel with a new one without renewing the pin or axle of the same is poor practice, because the old pin usually possesses a few flat spots or sharp edges which act as a reamer, thus reducing the life of the bushing to a minimum.

The use of oil on trolley wheels with graphite bushings also should be avoided, as graphite is more or less soluble in all lubricating oils—that is, most if not all lubricating oils possess a sufficient amount of solvent to destroy the graphite bushing. Therefore nothing but a good grade of grease should be used on these bushings, and the best grease usually will be that recommended by the manufacturer of the graphite bushings.

ROYCE L. GRIMES,
Electrical and Chemical Engineer.
Cleveland, Ohio.

Building Up the Commutator and Core On Mine-Locomotive Armatures

THERE are four general methods of mounting the commutator and core on a locomotive motor-armature shaft. On the more modern motors, especially of the smaller sizes, the iron is built directly on the shaft and held in place by a nut at the commutator end; this arrangement is used mostly on the ventilated type motors having longitudinal ventilating ducts through the core and a fan at the rear end. Where space is available the spider type of construction also is used. The other two types mentioned below have been superseded, as it is necessary to disconnect the armature leads from the commutator when a shaft is to be replaced. Some of these older type shafts have wiper rings screwed on the shaft, but this practice has been changed to a shrunk-on type of wiper on the more modern motors.

Iron Built on Shaft, Nut at Commutator End.—In Fig. 1 is shown the construction in which the armature iron and commutator bushing are mounted directly on the shaft and depend upon the press fit, the key, and the locknut at the commutator end to keep them in place. The fan and commutator-end wiper ring, which have been shrunk on, are removed by heating them with one or more blow torches (keeping the shaft cool by wrapping it with wet asbestos) and driving them off with a hammer and chisel.

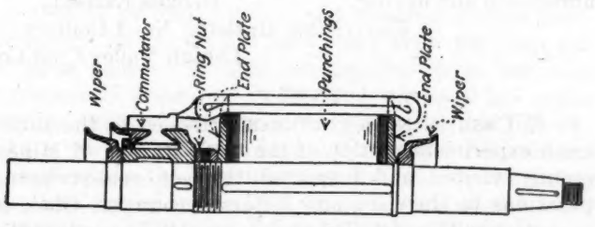


FIG. 1—IRON BUILT ON SHAFT NUT ON COMMUTATOR END
The iron is placed directly on the shaft. This is the usual construction for armatures of small diameter.

After the fan and wiper are removed, clamp the core and commutator together by placing over the shaft two pieces of iron pipe, one on each end, large enough to clear the armature nut and long enough so that the plates placed over the shaft and against the pipes will clear the end of the commutator and the end of the coils at the pinion end, as shown in Fig. 5. Bolt the plates together, using four or more bolts just clearing the outside of the armature. Take special care to cut the pipes off square and to pull the bolts up evenly to prevent warping the core when the shaft is removed.

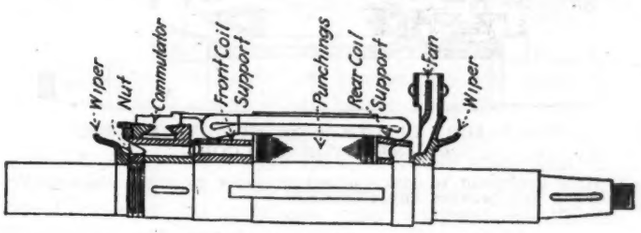


FIG. 2—IRON BUILT ON A SPIDER
This is the construction commonly used on mine locomotives and is claimed to afford better ventilation.

Allow clearance enough at the pinion end between the plate and the shaft so that the key will clear.

Another form of clamp has rings machined to fit the commutator and rear coil support, with bolts through the longitudinal vent ducts. When the clamp is in place, back off the locknut at the commutator end, press out the shaft by applying pressure at its commutator end, and replace with a new one. With the new shaft in the core, apply and tighten the armature nut, remove the clamp and shrink on the fan and wiper ring.

Spider Construction.—In Fig. 2 is shown the construction where the armature iron and commutator bushing are mounted on a spider, which is, in turn, mounted on the shaft. The commutator end wiper and the fan are shrunk on. To remove the shaft, take off the pinion end wiper ring (or fan, if a fan is used) by heating as described above. With this type it is not necessary to remove the commutator end wiper, as it comes off with the core. Pressure is applied at the commutator end of the shaft in removing. The new shaft is pressed in, and after it is in place the commutator end and pinion end wiper or fan are shrunk on. This method applies both to spiders with separate rear-end bells and to spiders with rear-end bells cast integral.

Iron Built on Shaft, Nut Between Commutator and

Core.—In Fig. 3 the commutator spider and core are shown mounted directly on the shaft with a ring nut between the commutator and the core. With this type of construction, it is necessary to lift the armature leads out of the commutator neck, remove the wiper rings and pull the commutator first. The commutator is provided with tapped holes for bolts to aid in this operation. After the commutator is removed, clamp the core together, using a modification of the clamping device shown in Fig. 5, back off the ring nut, and press out the shaft, applying pressure at the commutator end. After the new shaft is in place, apply the ring nut to secure the core, press on the commutator, shrink on the wiper rings and reconnect the windings.

Iron Built on Shaft, Not at Pinion End—In Fig. 4 is shown a type in which there is a shoulder on the shaft between the commutator and the core. In this case it is necessary to disconnect the windings the same as described in connection with Fig. 3. Remove the wiper rings and pull the commutator as described above. Clamp the core together, back off the ring nut at the pinion end and press out the shaft, applying pressure at its pinion end. Press in the new shaft and apply the ring nut, which should be drawn up tight before the clamp is removed. Replace the commutator and reconnect, then shrink on the wiper rings.

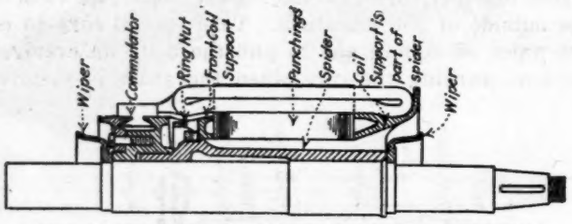


FIG. 3—IRON BUILT ON SHAFT NUT BETWEEN COMMUTATOR AND CORE

It is important to lock the nut properly to retain the core in position and prevent any vibration.

Precautions.—In connection with the replacing of shafts of locomotive motor armatures, the following points should be kept in mind:

(1) A little white lead on the shaft at the fit before pressure is applied acts as a lubricant and prevents rust.

(2) New shafts should have fillets at all changes in diameter, as they tend to prevent breaking of the shaft.

(3) New shafts should be made about 0.004 in. larger than the original shaft at the press fit, to insure the proper tonnage in pressing them in.

(4) Check the clearances between the top of the key and the keyseat in the core to prevent binding at this point.

(5) Chamfer the start of the commutator bore to allow the shaft to enter straight and get an even start.

(6) Shafts should be pressed in at approximately

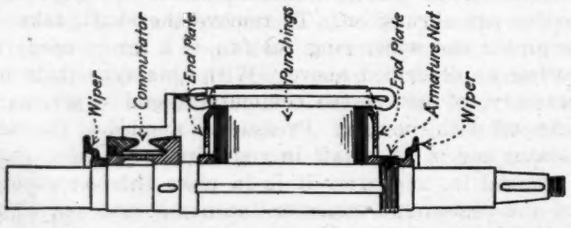


FIG. 4—IRON BUILT ON SHAFT SHOULDER BETWEEN COMMUTATOR AND CORE

In repairing the armature shaft it is necessary to avoid sharp changes in diameters, as these points usually develop into flaws.

FIG. 5—CLAMP FOR HOLDING ARMATURE WHILE SHAFT IS REMOVED

This device will facilitate the work when the shaft is to be replaced.

20 to 25 tons on motors from 25 to 50 hp. and about 40 to 50 tons for sizes above 50 hp.

(7) Wherever possible, the armature nut should be removed and replaced while the clamps are in place.

(8) Shafts will press out approximately 1.5 to 2 times the tonnage used when they are pressed in, because of slight rusting and flowing of metal.

(9) The press fit will vary, depending upon the material of the core. Steel or malleable iron can safely stand a higher tonnage than cast iron.

An Accomplished Feat of Drying Out an Electric Mine Locomotive

DURING the second week of March, 1922, a heavy downfall of rain flooded the lower levels of our Hazleton No. 1 slope and completely submerged one of the 7½-ton Baldwin-Westinghouse electric locomotives for a period of 34 hours.

As there was great demand for coal at that time and a large portion of the production of this colliery depended upon this locomotive, it was necessary to have it put back into operation with the least possible delay.

To accomplish this, it was decided to apply power to the normal motor circuits and set up enough heat to dry out the equipment without dismantling the locomotive. It was accordingly taken to a place of safety where men and material were in readiness to start the drying process. The water was first drained from both motors and the brakes were applied to prevent the locomotive from moving. Power was then obtained from the 275-volt trolley line through 12 frames of resistance grids. By turning the reverse drum to a series position to connect both motors in series and turning the controller on one notch, the current was maintained at 65 individual parts.

This method proved very successful as it required only 16 hours to dry out the locomotive completely and place it in operation.

Up to date, no bad effects have resulted from the amperes. This arrangement furnished sufficient current to raise the temperature in the windings and also the motor circuits enough to drive out the moisture very quickly, instead of the more lengthy process of taking the equipment apart and applying external heat to the submersion and drying.

GEORGE BRIESEL,
Electrician, Hazleton No. 1 Colliery,
Lehigh Valley Coal Co.

F. E. CASH, MINING ENGINEER, attached to the Pittsburgh experiment station of the U. S. Bureau of Mines, recently visited and inspected thirteen coal-stripping operations in Harrison and Jefferson counties, Ohio, in connection with a detailed study of methods employed in the various coal-stripping operations in the United States which is being made by the Bureau of Mines.

Problems of Operating Men

Edited by James T. Beard

Supporting Roof Over Roadway to Avoid Accidents

Method Much Used in England—Crossbars Supported on Eyebeam Stringers Resting on Steel Bars Set in Rib

REFERENCE has frequently been made in *Coal Age*, regarding the necessity of avoiding the use of posts for supporting the roof on roadways. It is readily recognized that many fatal accidents have occurred by reason of a derailed car knocking out one or more posts at the side of the road and causing a roof fall. To prevent this, it is necessary to find other means of supporting the crossbars than resting them on full-length posts standing on the bottom.

The most common form of timbering adopted for that purpose is the use of short legs set in hitches cut in the rib. This method has given good satisfaction where the coal is hard. Again, the plan is adopted of cutting hitches in the coal at the roof, or in the formation just above the coal and slipping the ends of the crossbars into these hitches, and wedging them tightly

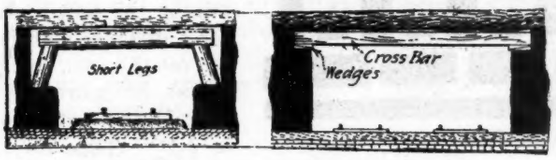


FIG. 1—TWO WAYS OF SUPPORTING CROSSBARS

in place. These two methods are shown in Fig. 1, the one on the left and the other on the right of the figure.

As has been pointed out in *Coal Age*, the success or failure of these methods depends on the nature of the coal and its ability to support the pressure thrown on it by the timbers. I have known of instances where the coal had very pronounced cleats that were well developed and when the timbers took the weight these cleavages running parallel to the entry opened up and slabs of coal fell into the road, bringing down the timbers and great quantities of loose slate.

Method of Roof Support Used in England

In this connection, permit me to describe what to my mind is an ideal method of timbering a main haulage road. As far as my knowledge goes, the plan has not been adopted in this country, but it is one that is frequently employed in England where it has given success. Briefly described, the method is as follows:

At a certain uniform height above the rail, chosen to conform to the conditions of haulage in the mine, holes are drilled in the ribs on each side of the road. Jackhammer drills are used for the purpose. These are operated by compressed air, the compressor being mounted on a truck running on the mine track, so that it can be moved from place to place as may be necessary.

The depth of the holes and the distance apart will, of course, depend on the hardness of the coal and the character of the roof, respectively. As shown in Fig. 2, short lengths of steel bars are driven into these

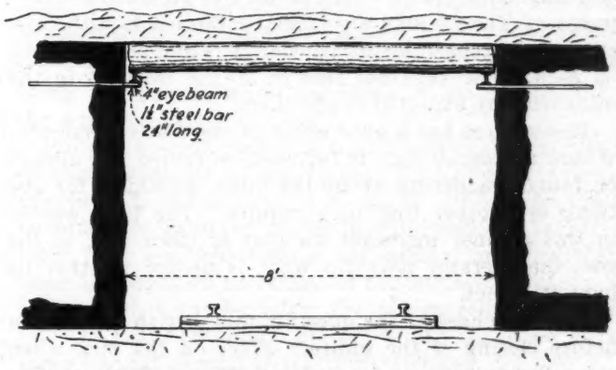


FIG. 2—CROSSBAR RESTING ON EYEBEAM STRINGERS

holes and allowed to project several inches into the entry; and on the bars are placed the iron rails or stringers, which are to form the supports for the crossbars spaced at equal distances apart.

To my mind, the entire plan is simple and effective. When the work is once complete there is little additional expense to keep the road in good condition. Where the roof is frail or tender, lagging must be used over the crossbars. Where cavities occur in the roof, the space must be filled with lagging that is built up crosswise, in successive layers, after the usual log-cabin style of timbering such places.

West Frankfort, Ill. GEORGE BOWKER.

Relation of Mine Supplies to Favorable Working Conditions

Ordering unneeded supplies is waste of material—System in care of supplies—Effect on working conditions and successful operation of the mine.

THERE is a vast distinction between getting what one needs and what one wants and just here lies a problem for the man who pays the bills. The waste at the average coal mine is very large and, in respect to at least one class of supplies, observation shows that more is wasted than is actually used.

There is a tendency among foremen of large mines to make out or sign a requisition for material without giving special thought to what is really needed. Trackbosses, timbermen and others in charge of particular work, usually make out a list of supplies for their own use. The list is given to the assistant foreman and turned over by him to the foreman, who then makes out and signs a requisition for the material and hands it to the superintendent or to his office clerk.

The chief thought of the man on the job who makes out the original list is to have plenty of material at hand with which to work; and if these supplies are given proper care it cannot be said there is any special waste in so doing. There is always a greater loss to the company when there is delay in waiting for needed material and, in many instances, the situation results in some makeshift construction that is highly unsatisfactory and means an increased cost of production.

Caring for All Tools and Supplies In Use

In order to overcome this condition and lessen the waste of material, many mines now require that all tools and supplies shall be taken to the assistant foreman's shanty, each evening. All small articles such as spikes, bolts and nails must be kept in buckets provided for that purpose. The buckets are made by the blacksmith, who cuts off the tops of empty powder kegs and puts a handle on each. The kegs are free to all the workers in the mine who are expected to use them.

This system has a good effect in more ways than one. Where no special plan is followed, workmen will always be found wandering about the mine searching for one thing or another that they require. The time wasted in this manner increases the cost of labor and, in the end, the operator pays for what is needed whether he buys it or not.

Another phase of the question that I wish to mention before closing is the indirect effect on the men when compelled to work under such conditions. It develops a lassitude and fatigue in every worker. They become listless and much of their work is performed in an aimless manner. A man in this condition does not possess an active mind. His memory is poor and his work becomes monotonous even to drudgery.

In my rounds I have carefully observed men working under favorable conditions and others at a disadvantage. The low-coal regions offer the greatest number of adverse conditions; and, I might say, it is rare to find a really efficient low-coal operation.

In a low-coal mine the first consideration should be to develop sufficient entry area to enable the circulation of an ample air current and facilitate the transportation of men and material. Efficient operation requires the brushing of roads and travelingways to give good headroom. The mine, including all working places, must be well drained and ventilated to insure favorable working conditions and successful operation.

Pikeville, Ky. George Edwards.

Disposal of Waste Mining Twin Coal Seams

Drive double rooms 30 ft. wide with two tracks—Take out both seams in first working—Build waste between tracks for support of roof.

ALLOW me to offer a suggestion on the proposition presented by a Kentucky superintendent and answered in *Coal Age*, May 10, p. 762, regarding the safe and economical working of a twin coal seam, consisting of a bottom bench of coal 52 in. thick and a 30-in. top bench, the two benches being separated by 30 in. of slate parting which he terms "middleman." The seam is said to be overlaid with a strong sandrock roof, while the slate parting, is weak and cannot be supported for any length of time.

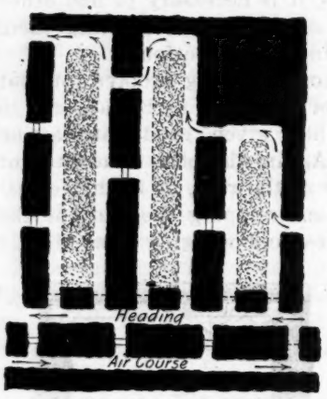
To attain the maximum recovery of coal from this seam with due regard for safety and efficiency, I would suggest driving double rooms 30 ft. wide, with track laid on each side of the room close to the rib. My plan would be to take out both the top and bottom seam in the first working, dropping the slate as the face is advanced and building this refuse in the shape of a solid packwall between the tracks.

The center slate or parting, which is 30 in. thick in the solid will occupy 50 per cent more space when broken and represent a thickness of $1.5 \times 30 = 45$ in., over the entire area of the room. But, allowing for two tracks each 8 ft. wide, in this 30-ft. room, leaves but 14 ft. for the width of the packwall between the tracks. The corresponding thickness of the slate refuse will therefore be $45 \times 30/14 = 96$ in., say 8 ft.

The total thickness of the seam, including the two benches of coal and the slate parting, is 9 ft. 4 in. I estimate that the broken slate, together with the other refuse generally produced in mining, will practically fill this space between the tracks and, with such timbering as may be needed will form ample support for the roof, in turning 30-ft. rooms.

Packwall Assists Ventilation

The packwall will also materially assist in conducting the ventilating air current to the working face. For the support of the gangway, as shown in the accompanying figure, a small pillar or entry stump should be left in the mouth of each room.



DRIVING DOUBLE ROOMS

If found practicable, the work of extraction should be started by mining the center slate for a distance sufficient to free the coal, so that it can be more easily blasted and gotten out in better shape for the market. This will, of course, necessitate the setting of temporary sprags to support the top coal until that is taken out. Also, if desired, the room tracks may be turned and extended along the face of the room and advanced from time to time as the work proceeds.

Tracks Available for Drawing Pillars

When the rooms have been driven the required distance the position of the tracks will greatly facilitate the extraction of the pillars. Here also, if roof conditions permit, the tracks in adjacent rooms can be turned and extended along the face of the pillar. Having the cars available along the face line not only lessens the breakage of the coal, but reduces unnecessary labor to a minimum by decreasing the distance the miner must handle his coal.

The depth of the seam is not given in the inquiry, but this factor would have to receive the fullest consideration in determining the relative width of rooms and pillars. Allow me to say in closing that the method of working suggested in the reply to this inquiry does not appeal to me as the most efficient. The plan there suggested was to mine the bottom seam of coal and take down the slate parting in the first working.

It was claimed that the top coal would make a good roof in driving the room its distance. The upper seam would then be taken down when drawing back the pillars. To my mind, when the necessary space is

allowed for the road, there is not sufficient available space remaining in the room for the stowage of the waste, which would have to be loaded out in cars or stored in some other part of the mine, either of which would be expensive. In addition to this, there would be a considerable loss of coal resulting when the top bench is dropped on to the fallen slate, and there would be difficulty in setting the necessary timbers.

Victoria, B. C. JAMES DICKSON.

[In answer to the suggestion of there not being sufficient space available for storing the refuse, let us assume a 24-ft. room with an 8-ft. roadway, leaving 16 ft. of available space at the side of the track. Then, allowing as before, an increase of 50 per cent in the volume of the broken material, the 45 in. corresponding to the 30 in. of slate parting would, in this case, give a thickness of $45 \times 24/16 = 67\frac{1}{2}$ in. for the height of the packwall at the side of the track. But the available height when the 52 in. bottom coal and 30 in. parting is taken out, is 82 in.

Again, it was stated, in our reply to the inquiry, that the fallen slate would be gobbed at the side of the track, which should, of course, be done before the top seam is taken down.

Once more, when drawing back the pillars and taking down the top seam, it would only be necessary to handle over the slate, which is loosely piled, and throw it back in the waste behind. It would not need to be "loaded out in cars or stored elsewhere in the mine." At least one advantage of the plan first suggested is a saving of timber and trackage. There is not the need of building solid packwalls out of the waste, which is loosely piled. Also, the props for the support of the roof are 6 ft. 10 in. instead of 9 ft. 4 in.—EDITOR.]

Inquiries Of General Interest

Exhaust vs. Blowing Ventilation, Slope Mine

Elevation at Top of Shaft Higher Than Mouth of Slope—Natural Air Column in Shaft Assists Ventilation in Winter but Retards It in Summer

THERE is a question that has puzzled me for some time past and I have not, as yet, been able to get a satisfactory explanation of it from others. May I, therefore, ask the privilege of submitting it to *Coal Age* and readers.

I am employed at a slope mine that is ventilated by a large reversible fan located at the top of an air shaft. The mouth of the slope is in the valley, while the air shaft has been sunk on the mesa, at a point a considerable distance back from the mouth of the mine. The elevation of the top of the shaft is about 500 ft. above the entrance to the slope. The depth of the air shaft is 900 ft.

The fan was installed to run ordinarily as a blowing fan; but, on certain occasions, we have operated it as an exhaust fan. At such times, I have been surprised at the large volume of air in circulation in the mine, although the fan was running at the same speed as before.

Kindly explain the reason for this observed difference; and state if it would not be an advantage to operate the fan continually on the exhaust principle of ventilation. FIREBOSS.

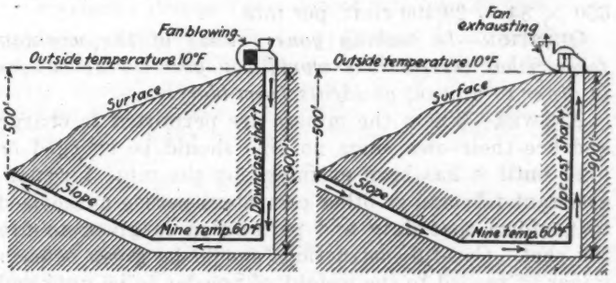
———, Colo.

The arrangement described by this correspondent is clearly illustrated in the two diagrams shown, side by side, in the accompanying figure. On the left, the fan is shown as blowing the air into the mine, the air shaft being the downcast, while the slope is the upcast. This is said to be the ordinary arrangement of the circulation in the mine.

On the right of the figure, the fan is shown as exhausting the air from the mine, the air shaft then being the upcast, while the slope is the downcast for the entire mine.

We will assume that it is winter and the temperature of the outside air is, say 10 deg. F., while the average temperature in the mine is 60 deg. F. When the fan is blowing air into the mine, in this case, the shaft is filled with the cold outside air having practically the same temperature as exists on the surface. But, in its passage through the mine, the air current is warmed and the temperature of the air filling the slope is the same as that given for the mine (60 deg. F.).

Now, observe that the upper 500 ft. of the shaft column is balanced by the corresponding 500 ft. of outside air above the mouth of the slope. Below this level,



ILLUSTRATING EFFECT OF NATURAL AIR COLUMN

the remaining 400 ft. in the shaft column is partly counterbalanced by the same vertical height of slope column. Therefore, the effective head of air, in this case, is only 400 ft. and the motive column, in terms of the outside air, is therefore

$$400\,\frac{60-10}{460+60} = \frac{400 \times 50}{520} = 38.46 \text{ ft.}$$

But, the weight of a cubic foot of the outside air, for a temperature of 10 deg. F., assuming a barometric pressure of 30 in., is $(1.3273 \times 30)/(460 + 10) = 0.0874$ lb.; and the pressure due to the motive column just found is $38.46 \times 0.0874 = 3.26$ lb. per sq.ft., nearly.

On the other hand, when the fan is exhausting air from the mine, the entire depth of the shaft is filled with the warm air from the mine, while the slope is filled with the cold outside air. In such case, the effective head of air column is the full depth of the shaft, 900 ft., since this warm shaft column is now in balance with the slope column and the 500 ft. of outside air column extending upward to the level of the top of the shaft.

Hence, again computing the motive column, in terms of outside air gives, in this case,

$$900\,\frac{60-10}{460+60}=\frac{900\times 50}{520}=86.54\text{ ft.}$$

The pressure corresponding to this motive column is, then, $86.54 \times 0.0874 = 7.33$ lb. per sq.ft.

Finally, since the quantity of air in circulation varies as the square root of the pressure, the quantity ratio will be equal to the square root of the pressure ratio. In the present case, the ratio in which the circulation would be increased when the fan is exhausting air from the mine would be $\sqrt{7.33/3.26} = 1.5$. In other words, the circulation would be increased 50 per cent, by reason of the greater effective air column when the fan is exhausting.

In the summer season, the conditions are generally reversed, the mine temperature being usually lower than that of the outside air; and, in that case, the effect would be to retard the circulation produced by the fan in about the same ratio. That is to say, the fan exhausting, in summer, would produce about two-thirds of what it would produce when blowing, for about the same difference in temperature between the mine air and the outside atmosphere.

Examination Questions Answered

Anthracite Foremen's Examination, Districts 3-7 incl., 1923

(Selected Questions)

QUESTION—*How many cubic feet of air will pass per minute along an airway 7 ft. high and 12 ft. wide, the velocity of the air current being 350 ft. per min.?*

ANSWER—The sectional area of this airway is $7 \times 12 = 84$ sq.ft. Then, assuming an average velocity, at this point, of 350 ft. per min., the volume of air passing is $350 \times 84 = 29{,}400$ cu.ft. per min.

QUESTION—*In making your rounds of the working faces, what instructions would you give to the miners in order to prevent accidents from blasts?*

ANSWER—Where the miners are permitted to charge and fire their own shots no hole should be charged or fired until it has been examined by the mine foreman, assistant foreman or other competent person authorized to perform that duty and permission is given to fire the shot. Careful instructions should be given to each miner in regard to the weight of powder to be used and the manner of charging and tamping the hole. The miner should also be instructed not to use too short a fuse, or bite off the match of a squib, or dip it in oil to hasten the firing of the shot. His tools should be examined to see that his bits conform to the proper gage and are not worn down so that the bore of the hole will be too small to allow the cartridge to be pushed into the hole without jamming; and to see that he is using a wooden tamping bar, or a bar that is copper-tipped. He must be instructed never to use two kinds or grades of powder in the same hole, or to fire two shots in the same place, at the same time, when one is a dependent shot. It is important to see that the miner is supplied with and uses proper tamping material. He must be instructed never to use coal dust or slack for that purpose.

QUESTION—*Under what conditions in a mine does the anthracite law require the mine foreman to withdraw the men under his charge?*

ANSWER—The law requires (Art. 12, Rule 8) that when a mine is found to be in a dangerous condition by reason of gas or other cause whatsoever, every precaution must be taken to insure the safety of the men; and all persons shall be withdrawn from the mine or section of the mine where such danger exists and not permitted to return, until the danger has been removed and the mine examined and found to be safe for work.

QUESTION—*What particular dangers are there in pillar drawing in a mine giving off explosive gas?*

ANSWER—The drawing of pillars in a mine generating gas will often be accompanied with an increased outflow of gas, owing to the settlement of the roof opening new fissures or breaks that permit the gas to escape into the workings. The danger is more imminent where the gas is contained in the roof strata or an overlying seam. If the gas comes from the floor, some increase in the outflow will be caused, at times, by the excessive pressure brought on the ends of the pillars.

QUESTION—*In a mine where 600 persons are employed, (a) what would be the minimum quantity of air required? (b) How many separate splits of the air current will be required to comply with the anthracite mine law?*

ANSWER—(a) The anthracite law (Art. 10, Sec. 3) requires a minimum quantity of 200 cu.ft. of air in circulation, per minute, for each person employed in the mine, and as much more as the conditions may require. For a mine employing 600 persons, this will mean a minimum air volume of $600 \times 200 = 120{,}000$ cu.ft. per minute.

(b) The law also requires (Sec. 6) the ventilation to be so arranged that not more than 75 persons will be employed at the same time on the same current. The number of splits necessary in the employment of 600 men in a mine is, therefore, $600 \div 75 = 8$ splits.

QUESTION—*What are the provisions of the anthracite law relative to the examination of old and new workings of a mine?*

ANSWER—The anthracite law (Art. 12, Rule 4) requires the examination, by the mine foreman or assistant foreman, at least once a week, of all accessible parts of abandoned portions of the mine, and the removal of any dangers found existing therein. A report of the examination must be entered in a book kept for the purpose and signed by the person making the examination.

Rule 5 of the same section of the law requires the mine foreman or assistant foreman to carefully examine all working places, traveling roads and other places where danger might exist, each morning, before the men enter the mine for work. The examination must be made within three hours of that time, using a safety lamp for the purpose. A report of the examination must be entered in a book kept for that purpose and signed by the person making the examination.

Annual First-Aid and Mine-Rescue Meet at Salt Lake City Is Largest Ever Held

"The safest men in America"—nearly 500 of them—demonstrated in Salt Lake City, Aug. 27-29, the skill that coal-mining men have learned in the vital art of rescuing and treating mine-disaster victims. It was the sixth annual International First-Aid and Mine-Rescue Meet. No larger meet has ever been held. In all, 54 first-aid teams from coal and metal mines in 14 states and Mexico and 21 mine-rescue teams—almost every one chosen by state and district elimination contests during the early summer—were there doing their best, and of them all the team which the Benton district of Illinois sent took highest honors with a team from the Anaconda Copper Co. ranking second.

The meet was noteworthy for several reasons. It was the first in which a team from Mexico took part, though Mexican teams have been spectators before. This time the Real Del Monte y Pachuca Co., of Pachuca, Hidalgo, Mex., sent a team which won much attention and third prize in the mine-rescue contest among 21 teams. Interpreters were used in order to translate the written problems to contestants. The Mexican score was 83. Also the meet was the first in which a negro team was entered. The one this year was sent by Local 1228 of the United Mine Workers at Dewmaine, Ill. The team was disqualified in mine-rescue because it grew panicky when a piece of apparatus went wrong in the outdoor gas gallery.

No Accident of Consequence to Mar Meet

Also it was noteworthy that the whole meet was engineered by the Bureau of Mines without a single accident of any consequence and with much more dispatch than most previous contests of the sort. Speed in the mine-rescue contest of the last day was gained by permitting, at times, as many as three teams to be in the wooden gas gallery at once. A team would enter while another was half way through its problem and a third was emerging at the end of its 12- or 15-minute trip. No team was rushed, however. Plenty of time was allowed and there were no interferences. The ten judges of the rescue contest, working in pairs, were stationed along the route through the gallery, so that every team worked at various stages of its problem under the eyes of every judge. This tended to produce fairer average scores.

The meeting opened on Monday morning, Aug. 27, in the big pavilion at Bonneville Park with inspection of equipment. For the rescue teams this consisted of an examination of each team member by ten judges working in pairs. This plan was intended to raise the factor of fairness in scoring by drawing in many judges' reports on each team instead of assigning only two or three judges to each team. All afternoon Monday and Tuesday the fifty-four first-aid teams worked out their problems on the floor of the pavilion. Wednesday morning the rescue teams began working in the outdoor gallery in the morning. The last one reported out at 1 p.m. and the meet was over except for the tabulation of judges' scores and the announcement of awards at the banquet that night.

Governor Charles R. Mabey, of Utah, speaking at the banquet, told the first-aid and rescue teams that no greater work for mankind can be done than that of training men as the Bureau of Mines and other agencies are now doing. He said that about 60,000 men in this country have already received training in first-aid work and 20,000 in mine rescue.

"It behooves every mine owner to thoroughly equip his mine with the best safety appliances known," said the Governor, "and it behooves every miner to obey safety rules and laws as completely as a soldier obeys army regulations."

In high tribute to the trained safety men of the country's mines, the Governor said they, above most mortals, are displaying in their work that spirit of which the Bible says, "No greater love hath any man than that he give his life for his friend."

Ross Beason, president of the Salt Lake City Commercial Club, presided. The other speakers were Mayor C. C. Neslen, of Salt Lake City, James H. Ball, representing the mining committee of the Chamber of Commerce, and W. Mont Ferry, who spoke for the operators of Utah.

D. J. Parker, of the Bureau of Mines, made the awards at the close of the banquet speaking. The awards follow:

First Prize, with honors, in combination mine-rescue and first-aid work (cup donated by Boyd Park Jewelers of Salt Lake City and silver cup from National Safety Council)—First-Aid Team 41 and Mine Rescue Team 1, Benton District, Benton, Ill.; Captain, Mungo Marshall; rating, 94.

Second Prize in Combination—First-Aid Team 33 and Rescue Team 13, Independent Coal & Coke Co., Kenilworth, Utah; Captain, J. R. Roaf; rating, 92.66⅔.

Third Prize in Combination—First-Aid Team 18 and Mine Rescue Team 3, Pacific Coast Coal Co., Black Diamond, Wash.; Captain, R. F. Snook; rating, 88.83.

Joseph A. Holmes special trophy for the company whose first-aid team and separate mine-rescue team get highest average rating in both first aid and rescue—Union Pacific Coal Co. First-Aid Team from Cumberland, Wyo., under Captain Lyman Fearne; rating, 94.08⅓, and Rescue Team from Hanna, Wyo., under Captain Thomas Meekin; rating, 76.

Mine Rescue.—First prize, Team 1; Captain, Mungo Marshall, Benton district, Illinois; rating, 95⅓. Second, Team 13; Captain, J. R. Roaf, Independent Coal & Coke Co., Kenilworth, Utah, rating 91⅓. Third, Team 6; Captain, Manuel Ramirez, Real del Monte y Pachuca Co., Pachuca, Hidalgo, Mexico; rating, 83.

Anaconda Copper Team Wins First-Aid Contest

First Aid.—First prize, Team 8; Captain, L. J. Deranleau, Anaconda Copper Mining Co., Great Falls, Mont.; rating, 97.91⅔. Second, Team 14; Captain, W. E. Wolfe, Clinchfield Coal Corp., Wilder, Va.; rating, 97.41⅔. Third, Team 24; Captain, Claude Alley, Clinchfield Coal Corp., Dante, Va.; rating 97.16.

Special prize of a cup for first aid winner of Rocky Mountain region.—Team 8; Captain, L. J. Deranleau, Anaconda Copper Mining Co., Great Falls, Mont.

State First-Aid Championships:

Alabama—Won by Team 40 representing the Woodward Iron Co., Mulga; Captain, W. L. Beaveret.

Colorado—Team 32, Colorado Fuel & Iron Co., Walsen; Captain, Dave Davis.

Illinois—Team 27, Southern Coal, Coke & Mining Co., Belleville; Captain, Frank Westwood.

Indiana—Team 59, Indiana Coal Operators' Association, Terre Haute; Captain, James Harkis.

Idaho—Team 49, Federal Mining & Smelting Co., Mullen; Captain, Axel Johnson.

Iowa—Team 21, Red Rock Coal Co., U. M. W. A., District 13, Melcher; Captain, R. E. Price.

Kansas—Team 10, Western Coal & Mining Co., Pittsburg; Captain, Louis Trego.

Louisiana—Team 54, Standard Oil Co. of Louisiana, Baton Rouge; Captain, R. C. Thorgeson.

Mexico—Team 12, Real Del Monte y Pachuca Co., Pachuca, Hidalgo; Captain, Sr. Manuel Ramirez.

Missouri—Team 19, Pierce Hess Coal Co., Bevier; Captain, Thomas A. Munn.

Montana—Team 8, Anaconda Copper Mining Co., Great Falls; Captain, L. J. Deranleau.

New Mexico—Team 53, Phelps Dodge Corp., Dawson; Captain James English.

Oklahoma—Team 5, Oklahoma Coal Operators and U. M. W. A., District 21, McAlester; Captain, L. Thompson.

Pennsylvania—Team 13, Bertha Consumers Co., Johnetta; Captain, T. L. Holsing.

South Dakota—Team 45, Homestake Mining Co., Lead; Captain, E. E. English.

Utah—Team 33, Independent Coal & Coke Co., Kenilworth; Captain, J. Richardson Roaf.

Virginia—Team 14, Clinchfield Coal Corp., Wilder; Captain, W. E. Wolfe.

West Virginia—Team 31, Davis Coal & Coke Co., Thomas; Captain, M. J. Brennan.

Washington—Team 18, Pacific Coast Coal Co., Black Diamond; Captain, B. F. Snook.

Wyoming—Team 42, Union Pacific Coal Co., Cumberland; Captain, Lyman Fearne.

Mine Rescue State Champions:

Illinois—Team 1, Captain, Mungo Marshall, Benton District.

Idaho—Team 9, Hercules Mining Co., Burke; Captain, Joe Revelli.

Mexico—Team 6, Real del Monte y Pachuca Co., Pachuca, Hidalgo; Captain, Manuel Ramirez.

South Dakota—Team 20, Homestake Mining Co., Lead; Captain, Orville E. Dunn.

Utah—Team 13, Independent Coal & Coke Co., Kenilworth; Captain, J. R. Roaf.

Wyoming—Team 4, Union Pacific Coal Co., Hanna; Captain, Thomas Meekin.

Washington—Team 3, Pacific Coast Coal Co., Black Diamond; Captain, B. F. Snook.

Washington Views Strike Calmly; Brief Suspension Expected

Thinks Actual Tonnage Loss Will Be Small—Coolidge to Give "Co-operation" and "Support"—Commission Confers on Bituminous Report

Despite suspension of operations in the anthracite field, official Washington faces the situation with equanimity, feeling that a distinct advance toward bringing the operators and miners into agreement has been accomplished by Governor Pinchot and optimistic that the suspension will be of brief duration. Federal officials evidently were mentally prepared for news that the Pennsylvania executive's offer had not been accepted wholly immediately. They had recognized that Saturday, the first day of the agreement-expiration period, is a half holiday in the collieries and that Monday was a holiday, thus giving time for developments without actual loss of much tonnage in those days.

Action toward putting into effect the machinery by which bituminous coal and coke might be sent into the anthracite-consuming regions was delayed. It was pointed out that even should the suspension in the anthracite field continue there would be no shortage of fuel for some time due to accumulated stocks. The desire evidently was to do nothing which might interfere with a successful conclusion of negotiations by Governor Pinchot remained.

Nevertheless, a White House spokesman represented President Coolidge as determined to use "all the resources" of the federal government to supply fuel to any section of the country needing it should the suspension of anthracite mining be prolonged. The President was represented as still hopeful of a settlement but as viewing the alternative calmly. The chief executive has given Governor Pinchot "full co-operation" in his efforts to harmonize the contending groups, it was said, and it was further asserted that President Coolidge will continue to give the Governor "full support," these two terms, "co-operation" and "support" being said to describe fully the President's attitude toward the negotiations initiated by the Pennsylvania Governor.

The members of the Coal Commission devoted several days during the week to consideration of their report on bituminous coal, which is to be submitted on or before Sept. 22, the date on which the Commission will expire by limitation. Reports from the staff on various phases of the soft-coal question were studied.

As a step in preparation for eventualities, the Bureau of Mines issued a statement by O. P. Hood, chief mechanical engineer, on the use of substitutes for anthracite.

Rocky Mountain Coal Institute Holds Annual Meeting

Seventeenth Gathering, at Salt Lake City, Featured by Discussions on Track Bonding, Mine Safety and Low-Temperature Distillation

The scope of the Rocky Mountain Coal Mining Institute is broad. It proved broad enough at the seventeenth meeting of the Institute in Salt Lake City, Utah, Aug 27 to 29, to include subjects ranging from discussions of safety in mines and the technicality of track bonding and of low-temperature distillation of coal along the lines now followed by Henry Ford, clear out to swimming in the Great Salt Lake and banqueting with the first-aid and mine-rescue teams of the continent that were also meeting at Salt Lake City. The Institute had a large attendance.

The sessions of the Institute were fitted into the program of the International First-Aid and Mine-Rescue Meet so that the members could watch the miner teams in the afternoons and hold their own sessions in the mornings. Little business was transacted at the meeting but the Institute, under President George B. Pryde, decided to work out a plan for organizing Institute chapters in each Rocky Mountain mining district which would try to draw all sorts of coal-mining men, right down to miners working at the faces, into the organization.

GEORGE B. PRYDE

President Rocky Mountain Coal Mining Institute

The Institute closed its meeting on the night of Aug. 29 with a banquet for members and their ladies. For this festivity a hall was used adjoining the great banquet hall in the Hotel Utah in which the first-aid and rescue teams were banqueting.

The Institute adopted resolutions of sympathy for P. J. Quealy, president of the Kemmerer Coal Co., and for the suffering towns of Kemmerer and Frontier, recently stricken by the explosion in Frontier mine. The grief of the Institute over the death of Carl Allen and of Prof. R. C. Hills was expressed in other resolutions.

Rail bonding in coal mines of this country is uniformly and inexcusably bad, according to D. C. McKeehan, chief electrical engineer of the Union Pacific Coal Co. In his paper, which was read to the Institute at its opening session by F. A. Rank, he recited some of the experiences of his company with various kinds of bonds until it standardized on electric welded bonds in 1919.

The first arc-weld bonds were placed on the outside of the rail ball but were too often knocked off by grooved wheels. Rails and splice plates were welded with some success until vibration and truck movement began to break such joints. At one time, in order to use up scrap copper wire a channel pin was placed over each end of an annealed copper wire about 20 in. long. Pin and wire were welded to the base of the rail. Some good joints were made but they were exceptional. Where these bonds were welded to the rail web the rail almost always broke, but these are the only cases of breakage of rails with arc-welded bonds.

For a time the company bonded with No. 2 bare iron wire, using two or three strands. This was cheap and successful on light rails or temporary track. The length

ROCKY MOUNTAIN COAL MINING INSTITUTE, SALT LAKE CITY, AUG. 27-29, 1923
Front row, left to right: F. W. Whiteside, former secretary-treasurer; W. D. Brennan, vice-president; George B. Pryde, president; Benedict Shubart, secretary-treasurer.

of iron was so small in the circuit that it added very little resistance.

The most successful plan the Union Pacific Company has ever tried is to use a flexible, copper arc-welded bond of sufficient length to span the splice plate attached to the inside of the rail base. On some occasions such as bonding in entries on idle days the welding resistance is connected into the circuit at the entry parting so that a welder need carry only the electrode holder, a short piece of cable to hook the trolley wire, the necessary bonds and welding wire.

"The results we have obtained," said Mr. McKeehan's paper, "are so gratifying that the matter of cost is considered irrelevant and no data has been kept."

A line in the paper to the effect that modern practice does not require bonding both rails brought objections in the succeeding discussion. Benedict Shubart, Mr. Rank and J. S. Veatch all declared both rails should be bonded. H. I. Smith said he thought bonds should be on the outside, not inside, of heavy rails because even badly grooved wheels cannot reach them. Bonds are more easily inspected when they are outside, away from piles of dirt and ballast.

A. C. Watts asked how far apart crossbonds should be spaced. George Murphy said bonding both rails with a 22-in. weld and with crossbonds every 100 ft. had reduced his locomotive repair bill 50 per cent. President Pryde said Mr. McKeehan favors crossbonding every 200 ft. Mr. Brewster favored spacing between 200 and 300 ft.

It was suggested that the rail ball is a bad place for bonds because of the danger of breakage, but that bell welds are far cheaper because they take less copper, and also that they are always easier to inspect.

Harking back to Mr. McKeehan's reference to bonding with iron wire Mr. Rank said iron's resistance is ten to fourteen times that of copper, so many men using it lay the old cables along the track so that they may help rails maintain the circuit. F. C. Miller remarked that iron oxidizes too quickly at the point of contact where electrolysis is highest.

William Littlejohn, general superintendent of the Utah division of the Utah Fuel Co., suggested that something ought to be done to correct the failure of employers and employees to work heartily together for safety. Rules are too carelessly made and entirely too carelessly carried out.

P. F. Patterson and G. A. Knox both signed a safety letter to the Institute contending for closer supervision at the mine faces, where at least 60 per cent of accidents occur from falls of roof and coal. Roadways should have 30 in. clearance and rooms at least 24 in. between rib or timber and the track, they believe. Props should be put under loose roof regardless of whether any established system calls for it. Stronger gloves and shoes on miners would prevent many hand and foot injuries. Fiber or metal helmets were advocated to reduce head injuries. Temporary cloth or rubber covering for trolley wires near repair jobs was another safety suggestion.

A long list of safety suggestions were made in the report of Dan Harrington, of the U. S. Bureau of Mines, and James Dalrymple, Colorado's chief mine inspector. Mr. Dalrymple was not present. They survey the chief causes of explosions and suggest that all ventilation systems have auxiliary power, that fans should run 24 hours a day, that every good-sized mine should have more than one air split, each able to deliver enough air to remove all methane as fast as it is liberated, and that ventilation should be under an up-to-the-minute active young man well educated in safety matters.

One per cent or more of methane in the air makes dust more explosive, they said, and the finer the dust the more dangerous it is, especially that finer than 20-mesh. Formation of dust can be reduced by using longwall mining exclusively and by using more holes and less powder in shooting, and the hazard is greatly reduced by washing down sides and roof as well as floor. Rock dusting often is preferable where water is short. Such dust should be used to keep down the percentage of combustible matter in roadway dust to 40 or less. Mr. Harrington and Mr. Dalrymple also favor electric safety cap lamps in all mines of whatever character, and the concealing of all underground cables in conduits. Solid shooting is inexcusable in any mine where the pitch is less than 30 deg., for coal can readily be undercut at any angle up to that. They think shotfirers should be required to have a certificate of competency to be reissued after an examination every five years. In their opinion half the explosions are traceable to defective or out-of-date equipment or practice. Coal-mine superintendents, foremen and firebosses should be required to pass a safety examination at least one in five years.

F. C. Miller, of the Colorado Fuel & Iron Co., read a paper tracing the history of briquetting and reported the progress that has been made in low-temperature distillation of coal. The mention of Henry Ford's interest in coal distillation roused a lively discussion, some of which will appear in a later issue of *Coal Age*.

Commission Publishes Cost of Anthracite To Dealers in Nine States

The U. S. Coal Commission published Aug. 29 figures showing the cost of stove anthracite at the mines and the freight to town, as reported by the dealers in New York, New Jersey, Michigan, Delaware, Maryland, Washington, D. C., Pennsylvania, Wisconsin, Indiana and Ohio. Some time ago these figures were given out for New England.

The commission makes this note with respect to these figures: "In using this cost-to-dealer information, allowance must be made on the one hand for the dealer's losses by degradation and his cost items and a fair margin of profit, and on the other for the 240 lb. difference in the ton used (the long ton). The allowance for the 240 lb. difference is necessary because New York dealers buy at the mines on the basis of gross tons (2,240 lb.) and sell at retail on the basis of the net ton (2,000 lb.)."

It is particularly notable that most of the quotations given by the dealers for stove coal are Company prices—from $8 to $8.30. In fact of the 1,791 quotations in these states, 1,288, or 72 per cent, were Company prices, and the remainder, or 513, were $9 or above.

The Commission announced some time ago that it would not attempt to show consumers in every town the retail price of their coal and the margins and profits made by the dealers, proceeding on the theory that if the townspeople know what the coal costs their retail dealers, and the individual knows what he has to pay the dealer for that coal, the public can make up its own mind as to whether the local dealer is doing the business on a reasonable margin or is exacting an undue profit.

Railroads Consume Less Coal in June

Class I railroads of the United States consumed 8,296,000 net tons of coal during June, 1923, as charged to account 394, compared with 9,034,000 tons during the preceding month and 6,804,000 tons in June, 1922, according to a recent report of the Bureau of Statistics of the Interstate Commerce Commission covering 177 steam roads. During the first six months of 1923 these roads consumed 56,882,000 tons as compared with 45,123,000 tons during the corresponding period of 1922. The delivered cost per ton in June last was $3.42 compared with $3.83 for the corresponding month of last year.

Consumption of fuel oil during June totaled 151,732,000 gallons compared with 147,694,000 gallons in May, 155,062,000 and 119,598,000 gallons in June, 1922. The totals for the first six months of 1923 and 1922 were 896,625,000 and 713,097,000 gallons respectively.

190 Coal-Mine Fatalities in July

Fatal accidents to employees at coal mines in the United States during July, 1923, numbered 190, according to reports received from state mine inspectors by the U. S. Bureau of Mines. The fatality rate was 3.55 per million tons, based upon 53,446,000 tons of coal produced during the month, as compared with a rate of 3.18 in the previous month and of 5.27 for July last year. For bituminous mines alone the July rate was 3.28 as against 4.96 for the same month a year ago. For anthracite mines alone the July rate was 5.05 per million tons; there is no corresponding figure for July last year because the mines were closed on account of the miners' suspension of work. The average fatality rate for July during the past ten years is 3.82 per million tons for bituminous mines, 6.41 for anthracite mines, and 4.22 for the entire coal-mining industry. It will thus be seen that the accident rates for July, 1923, were lower than those for July last year and also lower than the ten-year average rates for the same month.

The record for 1923 to the end of July shows 1,424 fatalities indicating a rate of 3.77 per million tons, as compared with 4.21 per million tons for the corresponding months last year. The bituminous rate for seven months of 1923 is 3.49 as against 3.92 for the same period last year; the seven-months anthracite rate is 5.28, as against 6.75. The accident record for 1923 to date shows a reduction of 11 per cent in the fatality rate for bituminous mines, 22 per cent for anthracite mines, and 10 per cent for all mines combined.

COAL-MINE FATALITIES DURING JULY, 1923, BY CAUSES AND STATES

(Compiled by Bureau of Mines and Published by *Coal Age*)

State	Underground													Shaft					Surface							Total by States	
	Falls of roof (coal, rock, etc.).	Falls of face or pillar coal.	Mine cars and locomotives.	Gas explosions and burning gas.	Coal-dust explosions (including gas and dust combined).	Explosives.	Suffocation from mine gases.	Electricity.	Animals.	Mining machines.	Mine fires (burned, suffocated, etc.).	Other causes.	Total.	Falling down shafts or slopes.	Objects falling down shafts or slopes.	Cage, skip, or bucket.	Other causes.	Total.	Mine cars and mine locomotives.	Electricity.	Machinery.	Boiler explosions or bursting steam pipes.	Railway cars and locomotives.	Other causes.	Total.	1923	1922
Alabama	4												4													4	7
Alaska																										0	0
Arkansas																										0	0
Colorado		5				1							6													6	3
Illinois	4		4					1					9													9	1
Indiana	2		3										5	1		1		2								7	2
Iowa																										0	2
Kansas	1												1													1	2
Kentucky	6		3					1					10													10	12
Maryland																										0	0
Michigan	1		1										2			1		1								3	0
Missouri	1												1			1		1								2	0
Montana	2												2													2	0
New Mexico																										0	0
North Dakota																										0	0
Ohio	11		1										12													12	4
Oklahoma																										0	0
Pennsylvania (bituminous)	18	4	11			2		3				3	41							1			1	2	4	45	23
South Dakota																										0	0
Tennessee																										0	2
Texas																										0	0
Utah																										0	3
Virginia																										0	4
Washington			1										1													1	0
West Virginia	22		14			1		3					40						1						1	41	22
Wyoming	3		2										5													5	0
Total (bituminous)	75	9	40			4		8				3	139	1		3		4	1	1			1	2	5	148	85
Pennsylvania (anthracite)	13	7	3	1	1	4		1				5	35	2		1		3			1		1	2	4	42	6
Total, July, 1923	88	16	43	1	1	8		9				8	174	3		4		7	1	1	1		2	4	9	190	...
Total, July, 1922	48	3	8	1		6		8		1			75	2		1		3	3	1				9	13		91

Salient Points in Governor Pinchot's Proposal to End Wage Controversy

Upon the basis of the information assembled, with the profound belief that it affords a basis of settlement which is reasonable and just, which miners and operators alike may accept with credit and honor, and with the firm conviction that fairness to the anthracite-using people of America requires that it shall be accepted, I recommend the following basis of settlement, with the understanding that all questions concerning it or not covered by it shall be referred to the Joint Conference of Scale Committees, and that the Anthracite Conciliation Board shall determine any questions upon which the Joint Conference cannot agree:

(1)—Recognition of the basic eight-hour day for all employees. If longer hours are necessary at certain times, or in certain occupations, the overtime to be paid for at the eight-hour rate.

(2)—A uniform increase of 10 per cent to all employees, this increase to take effect Sept. 1.

(3)—Full recognition of the union by the operators, without the check-off, but with the right to have a union representative present when the men are paid. I do not regard the question of the open or closed shop as an issue in this controversy.

(4)—Complete recognition of the principle of collective bargaining.

Anthracite Mine Workers Walk Out September 1; Pinchot Hopeful of Early Settlement

Although Governor Pinchot was not successful in averting the anthracite strike, which started at midnight Aug. 31, his peace plans have not yet been utterly rejected and he again renewed his efforts to bring about a settlement on Wednesday afternoon at 2 o'clock, when the conferees resumed their parleys at Harrisburg. All of the mine workers are out except the maintenance men, numbering between three and four thousand.

The conference started Aug. 27, when the Governor presented his reasons for prompt action, suggesting separate meetings with the operators and with the miners, a plan that was readily agreed to. The miners met with him Monday afternoon, Aug. 27, and the following day he met the operators and then held conferences later with the miners and the operators, concluding two meetings with each within a day after calling the general conference.

On Wednesday the Governor presented his peace proposal, consisting of four points and several supplemental matters, these latter including his modified plan of arbitration for the settling of disputes before the Anthracite Conciliation Board—a fifth point, really, that has concerned the miners greatly during the conference. The four points were recognition of the basic eight-hour day for all employees, a uniform increase of 10 per cent in wages, full recognition of the union by the operators without the check-off and complete recognition of the principles of collective bargaining.

Operators Seek Four-Year Agreement

The two sides to the controversy gave their answers to the Governor on Friday, Aug. 31, Thursday having been devoted to a study of the Governor's recommendations. The operators accepted three of the four points, and on the fourth, that of an increase in wages, said that while they were opposed to any increase at this time, if there is to be an "uneconomic wage" the new contract should cover a four-year term. The miners accepted the eight-hour day proposal and that relating to collective bargaining, but contended that while the wage increase proposed is a "step in the right direction" it does not adequately provide for the day workers. They rejected the check-off arrangement of the Governor, which would permit a union collector at the pay window on pay days.

The operators and miners met in joint conference at the Capitol on Friday and remained with the Governor for five hours. The Governor separated the two sides soon after they reconvened and acted as intermediary during the long discussion, once calling them together when he believed he could convince them that a settlement could be effected. At this joint meeting John L. Lewis, president of the United Mine Workers, and Samuel D. Warriner, spokesman for the operators, spoke. It is said that the Governor at that time suggested that he act as arbitrator, but that the operators bluntly told him that he was not sufficiently qualified in mining matters to assume such a position. Again on Saturday there was a joint session and this lasted but 35 minutes. It was then agreed to take a recess until Wednesday, Sept. 5.

At the conclusion of the meeting on Saturday, Sept. 1, Governor Pinchot said he felt encouraged but he would not say upon what he based this feeling. Neither operators nor miners would discuss the situation in any way. The Governor issued the following statement in which he stressed the public's side of the matter and pointed out that a winter with little anthracite in Pennsylvania means many additional deaths. Here is the statement:

"The essential and encouraging fact is that the negotiations, which yesterday were lagging, are still going on. Both committees have suggested an adjournment for the purpose of more carefully considering the whole situation, including the four points of my recommendations. But since each committee will do so from the point of view of the interests of its own side, this seems to me like a good time for the people to consider their own interests also and to make their will known through the fullest public discussion.

"In these negotiations I have been representing the public and its necessity to get coal. To get coal we must find a common ground upon which miners and operators may meet and settle their differences with some regard for the public right. That common ground, in my opinion, properly covers a wage increase and a slight temporary rise in the price of coal. The choice lies between that and the threatened shortage.

"The public is the most numerous and the most important party to this controversy. Its rights are paramount. Its welfare is the first consideration. The health and welfare of the people are directly and most seriously threatened by the closing down of the mines. . . .

"Both committees have agreed to meet me again in Harrisburg on Wednesday, Sept. 5, at 2 p.m. I welcome this breathing space for the hard-pressed leaders on both sides, and I urge them to use it in acquiring a realizing sense of the public point of view. This is not a private quarrel. Neither miners nor operators have any right to disregard or overlook the public suffering which would follow a prolonged strike. The patience of the people is very near its end. We have seen it pushed beyond endurance before, and we have seen the results."

The Governor's presentation on Aug. 29 of his idea of a way to avert the strike was, like his statement read at the opening of the parley, Aug. 27, clear and to the point, and both sides seemed gratified with the way in which he had handled a knotty problem, if not satisfied with his conclusions.

The 10 per cent increase in wages, one half of what the miners asked, would mean, he said, 60c. per ton additional

to the cost of domestic sizes at the mine. Ten cents of this should be absorbed, he suggested, by the operators and the remaining 50c. eventually should be taken out of the cost of transportation and distribution.

The statement follows in part:

'My justification for proposing a basis upon which I believe this strike can be prevented with justice to all parties is threefold:

"First, that this controversy has continued until all chance of agreement by direct negotitations between the miners and operators has been lost."

"Second, that the interest of the miners, the operators and the public all require that this controversy shall be settled without a strike.

"Third, that the public is entitled to a voice in the discussion and the rights of the people generally deserve consideration at least as much as those of the miners and the operators.

"Under such circumstances, and in a case where the public welfare so urgently requires protection, the people have the clear and unquestionable right to demand a settlement.

"I suggest as a means of avoiding or settling differences that if in the course of collective bargaining the scale committees of the miners and operators are unable to agree they shall select a man agreeable to both sides to attend and take part in their discussions, but without a vote, and not as umpire or referee. If they are still unable to agree, their differences shall be referred to the Conciliation Board, which shall be provided with whatever equipment is necessary for the rendering of prompt decisions.

"I am strongly of opinion that an agreement signed on the foregoing basis should cover not less than one year.

"The whole body of wage rates in the anthracite field is antiquated, haphazard and honeycombed with inequality. It needs revision. I suggest that the Anthracite Conciliation Board be authorized by the Joint Wage Scale Committees to undertake and complete within a year a thorough revision, and for that purpose be supplied with the necessary help.

"The proposed increase of 10 per cent is recommended in view of the high degree of skill required among the miners and the extra hazardous nature of the occupation. Five hundred workers are killed and 20,000 are injured each year.

Wage Increase to Raise Cost 60c. per Ton

"The 10 per cent wage increase, according to the best figures available to me, will add 60c. a ton to the cost of domestic sizes of anthracite coal at the mine. Of this amount not less than 10c. can be and ought to be absorbed by the operators without any increase of price. In the last three months of 1922 and the first three months of 1923 their profits have been greater than ever before in their history. But the extent to which these producing conditions will continue no one can now predict with confidence.

"The remaining 50c. per ton should not in the end be taken from the consumer. The whole of it can easily and properly be taken out of the cost of transportation and distribution.

"Anthracite mines vary in the cost of producing coal. A very considerable percentage of the mines could bear at least half of the probable increase of 60c. per ton and still run at a fair profit. Others, operating on a smaller margin, might be forced to close down if their cost of production were raised even by a much smaller amount. To decrease the margins at the mines more than 10c. per ton now might unduly reduce production. It is to the public interest that bins be filled for the winter and that factories continue to operate. When production is assured I intend to recommend construction plans that will, I am confident, prevent any part of this increase of 50c. a ton going to the consumer.

"I believe the proposed settlement to be fair to all three parties to this controversy. It is fair to the miners, for it will notably improve their condition as to wages, hours and recognition of the union. It is fair to the operators, for it leaves them in position to continue running their mines, and to do so at a reasonable profit. It is fair to the public, for the public can better afford to get anthracite at a slight increase in price, if that cannot be avoided, than not get anthracite at all. In particular, it leaves both miners and operators far better off than either would be if the contention of the other had been accepted.

"I call the attention pointedly of both sides to the fact that neither miners nor operators, whether the strike goes on or whether it does not, can hope to have their own way fully in the end. Whether now or later, a compromise is inevitable. It is immensely to the advantage of each of the three parties in interest that the compromise shall be made before the enormous loss and suffering of a strike is undergone, rather than afterward."

The general polices committee of the anthracite operators held a long session in Philadelphia Aug. 30 considering Governor Pinchot's proposal for settlement of the wage controversy and reached a decision, to be presented to the Governor at Harrisburg Friday. In keeping with the suggestion of the Governor that he be first informed of the response to be made by both miners and operators, the coal company representatives withheld all information on the subject.

Virtually the entire anthracite industry was represented at the meeting, which was held in the office of the Lehigh Coal & Navigation Co., of which Mr. Warriner is president. Besides Mr. Warriner, among those who attended the meeting were: W. J. Richards, Philadelphia; W. W. Inglis, Scranton, and A. B. Jessup, Hazleton, of the subcommittee which is directly negotiating with the miners; J. M. Humphrey, Wilkes-Barre; W. L. Allen, Scranton; A. C. Dodson, Bethlehem, Pa.; Percy C. Madeira, Philadelphia; E. H. Suender, Frickville, Pa.; A. M. Fine, Scranton; A. Morris, Scranton; S. B. Thorne, New York; J. F. Bermingham, New York; J. B. Warriner, Lansford, Pa.; Thomas Dickson, New York, and C. D. Goldsborough, New York.

Reports Differ on Who Beat Pascoe

In a communication to the U. S. Coal Commission Aug. 29 Ellis Searles, John Moore and Thomas Kennedy, representing the miners' union, charge that Samuel Pascoe, of Ashland, Ky., president of District 30, on Aug. 3, was attacked and badly beaten "by hired emissaries of coal companies." Pascoe is head of a district taking in the northeastern Kentucky field, and on Aug. 3 was in Paintsville, "on business," when he received a beating which appears to have been the result of a quarrel.

The committee which is acting in the matter for the union, according to information received from Washington, alleges that the attack on Pascoe is but one of many instances of intimidation employed against union miners in the non-union fields of West Virginia, eastern Kentucky, Alabama and Colorado.

A report of the affair from Paintsville, Ky., differed considerably from the union story from Washington. The Paintsville report stated that Pascoe was not attacked by "hired emissaries" of any coal company, as far as the authorities know. According to the police who investigated the affair, witnesses and others familiar with the circumstances, Pascoe was the loser in a fistic encounter with Link Castle, of Paintsville, in a restaurant. The fight resulted from a quarrel, the nature of which seems not to be known to others. Castle's friends say he is in no way connected with any coal company.

The annual convention of the New York State Coal Merchants Association, to be held at Sacandaga, Sept. 10, 11 and 12, will be addressed by W. H. Williams, vice-president, Hudson Coal Co.; Alan C. Dodson, president, Weston Dodson & Co., Bethlehem, Pa.; Franklin Bache, Philadelphia; G. H. Ingalls, vice-president, New York Central Lines, New York; Walter Gordon Merritt, general counsel, Anthracite Operators Committee, New York, and the following officers of the National Retail Coal Merchants Association: Samuel B. Crowell, president, Philadelphia; Roderick Stephens, former president, New York; R. J. Wulff, treasurer, Brooklyn, and Joseph E. O'Toole, resident vice-president, of Washington.

Operators and Miners Reply to Governor Pinchot

The operators' reply to Governor Pinchot's proposal for settlement of the controversy that has resulted in a strike of anthracite miners was as follows:

"With respect to your proposal No. 1:

" 'Recognition of the basic eight-hour day for all employees. If longer hours are necessary at certain times, or in certain occupations, the overtime to be paid for at the eight-hour rate.'

"We agree to this proposal. It will add some $2,250,000 to the annual wage bill of the industry, or 5c. per ton to the cost of the domestic sizes.

"With respect to your proposal No. 2:

" 'A uniform increase of 10 per cent to all employees. This increase to take effect Sept. 1.'

"This would add about $30,000,000 to the wage bill. We are still firmly of the opinion that no general increase in the wages of anthracite mine workers at this time is justified and are supported in this belief by the findings of the U. S. Coal Commission, as follows:

" 'The earnings of full-time workers certainly permit the essentials of a reasonable standard of living. Those who take full advantage of their opportunities to earn in the various occupations connected with the industry, and are not handicapped by serious misfortune, need not suffer for shelter, food, clothing or other decencies and comforts of life, even without supplementary earnings of wife and children.'

"Since you justify your proposed increase as a recompense for skill and hazard, we invite your attention to the fact that these factors have no application to a large part of the workers. As to those to whom they do apply, they have been stressed and considered in every negotiation and arbitration in the last twenty years and already find expression in the wage structure.

"The present wages were fixed by the award of the Wilson Arbitration Commission in 1920, when they were increased 17 per cent in recognition of the high cost of living then prevailing. In spite of the decreased cost of living and decreased wage rates in other industries, the anthracite wages have been maintained at this peak. These rates afford earnings over 150 per cent above prewar earnings, as compared with an increased cost of living of about 62 per cent.

"Considering the foregoing, any favorable consideration by us of your proposal for a 10-per cent increase must be conditioned upon a durable agreement covering a period of years, with provision for the annual revision of wages on a sound economic basis. If the parties cannot agree upon the revision such determination of wages shall be referred to such a commission as may be specified in the agreement, no suspension to take place pending such determination.

Operators Say Price Increase Would Be 75c.

"You recognized that your proposed increase in wages will add 60c. per ton to the cost of domestic coal. We estimate it would be a minimum of 75c., excluding the pea size. You acknowledge that most of this increase must be added to the price of coal at the mines. The amount of the increased price to the ultimate consumer will be determined by the ordinary course of economic laws, as statute laws forbid the operators or dealers from entering into any agreement as to prices.

"You state that of an estimated increase production cost of 60c. per ton, 50c. 'can easily and properly be taken out of the cost of transportation and distribution.' The cost of transportation can only be reduced through the unpredictable action of the Interstate Commerce Commission; the cost of distribution can only be reduced through voluntary action of distributors. We do not see how such reduction can be assured by any private person or public official and until these reductions are assured the public will have to pay the cost of increased wages.

"With respect of your proposal No. 3: 'Full recognition of the union by the operators without the check-off, but with the right to have a union representative present when the men are paid. I do not regard the question of the open or closed shop as at issue in this controversy.' This proposal, as we understand it, involves merely a continuance of existing practices, to which we assent.

"There is already full recognition of the United Mine Workers of America, as evidenced by the existing agreement between us. From your statement that you 'do not regard the question of the open or closed shop as at issue,' we assume that you have no intention of suggesting that the award of the Roosevelt Coal Commission of 1902, bearing upon this matter, should in any wise be changed. That award provides:

" 'That no person shall be refused employment, or in any way discriminated against, on account of membership or non-membership in any labor organization; and that there shall be no discrimination against or interference with any employee who is not a member of any labor organization by members of such organization.'

"In reply to your suggestion that the union have 'the right to have a union representative present when the men are paid,' we beg to state that this is an existing practice and there is no objection to continuing the provision of the existing contract in this respect.

"With respect to your proposal No. 4: 'Complete recognition of the principle of collective bargaining.'

"Complete collective bargaining, as we understand it, now exists throughout the industry whereby agreements are made periodically with the union. These agreements cover wages and working conditions and further provide that all differences arising during the term of the agreement not otherwise adjusted shall be settled by the Board of Conciliation and Umpire. We agree that this practice of collective bargaining shall continue.

"In making this response to your proposals we do so upon the understanding that the other demands of the miners presented at the Atlantic City conferences, not heretofore agreed upon, shall be deemed abandoned.

"In closing, permit us to repeat the thought that the public is now entitled to a complete and durable settlement. If at this time it is to be asked, even temporarily, to bear the burden of an uneconomic wage, it must be safeguarded against an early recurrence of this unfortunate situation, and must be assured that the principle of orderly adjudication is now receiving some recognition."

Miners' Response to Pinchot Proposal

The miners' replied to Governor Pinchot's proposed plan of settlement in relation to wages is as follows:

"The principle of the eight-hour work day as applying to all employees in the anthracite industry has already been agreed upon by the operators and miners in joint conference. The details of the hourly and daily rates affected by this change have also been worked out as affecting the maintenance men, and it may be logically assumed that similar satisfaction may be achieved in the adjustment of the rates of all other men affected.

"Your suggestion for an increase of 10 per cent as affecting the contract miners is a step in the right direction, although not compensatory for the distinct service rendered by such men and being insufficient to meet their needs. We also desire to call your attention to the fact that 65 per cent of the men employed in the anthracite industry are paid by the day, and the application of a percentage increase to the multiplicity of rates in this classification is wholly unsatisfactory for two substantial reasons:

"A percentage increase would widen the existing differentials between the various classifications of labor and thus accentuate the existing inequalities in rates, which constitute a source of bitter complaint among the men affected.

"A percentage increase also has the effect of giving to the lowest paid worker a lesser increase in actual wages than is given to those who enjoy a higher rate.

"Experience has taught the necessity of translating percentage increase into an equivalent number of cents per day for application to the rates of those who are thus

employed. The representatives of the mine workers therefore desire to impress you with the importance of this matter."

Miners' Reply in Regard to Check-off

The text of the miners' response on the check-off follows:

"The mine workers regret your refusal to incorporate the check-off arrangement in your recommendations. The fact that your refusal is not amplified by any explanation leads us to assume that you did not, perhaps, have full information available on this subject. We desire consideration of the check-off for two reasons, viz.: as a matter of convenience and economy in the maintenance of the organization and the administration of its affairs; to give greater stability to the joint wage agreement and to insure the punctilious observance of all contractual obligations in harmony with the recommendations of the U. S. Coal Commission. Such a provision in the agreement would not in any manner add to the cost of the anthracite commodity. No valid objection can be made to the check-off unless one persuades himself to believe that the extension of a courtesy constituting a convenience to the United Mine Workers of America can be construed as a reprehensible act.

"The mine workers' representatives do not request that the check-off apply to any individual other than those who file a voluntary written order, constituting a legal assignment, for the exercise of the privilege.

"We call your attention to the fact in the bituminous mining fields of central and western Pennsylvania, that approximately 100,000 mine workers enjoy this privilege through their wage agreements with the bituminous operators. For a quarter of a century this arrangement has existed in the bituminous districts where collective bargaining is recognized and the anthracite mine workers are only requesting that equal recognition be accorded them as is given by other coal operators.

"May we not point out that important producers of anthracite having operations in the bituminous districts freely admit the virtue and permit the existence of the check-off arrangement in their soft-coal mines while issuing fulminations against it in the anthracite territory? This is particularly true as affecting the Susquehanna Collieries Co., the Madeira-Hill interests, the Glen Alden Coal Co. and others, the Delaware & Hudson and others.

"The Delaware & Hudson Railroad Co., which is one of the most important of the railroads producing anthracite, has organized its own company union among its shop employees. Membership in the company union is compulsory upon those accepting employment and the monthly membership dues are deducted from the employees' pay envelopes. Paradoxical as it may seem, the representatives of the Delaware & Hudson Railroad Co. are among the most virulent in their opposition to the mine workers' request for a check-off arrangement. They pursue a 'Dr. Jekyll and Mr. Hyde' labor policy in this respect, which engenders unrest and breeds discontent.

"It is also true that practically all of the railroad systems of the country who are still resisting the shopmen's legitimate trade unions have organized company labor unions among their shop employees. These unions are organized and conducted solely in the interests of the railroad companies, and membership in them is made compulsory, and through the instrumentality of the check-off the railroad companies collect the monthly dues.

"It will thus be recognized that the corporate foes of the United Mine Workers of America do not hesitate to utilize the check-off arrangement when it serves their particular ends, while at the same time they fulminate against the mine workers' request for consideration upon this point.

"As representatives of the United Mine Workers of America we feel that in the absence of any reasonable or valid objection to the check-off by the anthracite operators we are entitled to recognition on this point.

"We understand that your fourth recommendation, affecting the principle of collective bargaining, means that the anthracite operators would forego their practice of contracting with individual employees for service at less than the prescribed rates. We further understand that it means that the workers have an inherent right to exercise their voice and judgment, through representatives of their own choosing, upon matters affecting wages, hours of labor and conditions of employment. With this recommendation we find ourselves in entire accord.

"In consideration of these several matters, including the remaining number of eleven demands of the United Mine Workers, we feel that your action has paved the way to a reopening of joint wage negotiations between the anthracite operators and the representatives of the mine workers. Such a conference could take your wage suggestions for contract miners as a basis, and by diligent application could probably make substantial progress in working out a new agreement. We accordingly advise Your Excellency that the representatives of the mine workers will hold themselves in readiness to enter such joint conference at any time such a meeting can be arranged.

"We note your further suggestion that in the process of collective bargaining both sides should select an individual to attend meetings and take part in discussions without a vote, and that in the event of failure to agree all differences should be referred to the Anthracite Board of Conciliation, which would result in ultimate decision by the Umpire attached thereto.

"Whether or not it was so intended, the language of your suggestion would imply that the mine workers should accept for the future permanent arbitration of the major provisions of wage agreements. We believe that such an expression is in conflict with the principle enunciated in your fourth recommendation, which grants the complete recognition of collective bargaining. We scarcely feel that it is necessary, in any detailed form, to analyze our publicly recognized opposition to arbitration of the basic principles of wages, hours, working conditions and human relationship in the anthracite industry. Our position on this matter has been made known to the President of the United States, and from time to time has been restated to governmental agencies, including the U. S. Coal Commission. The anthracite operators, upon repeated occasions, have been formally advised of our attitude on this question.

"We find ourselves in harmony with your further suggestion that the Anthracite Board of Conciliation be authorized to undertake and complete a further revision of the whole body of the wage rates in the anthracite region which you so aptly describe. The representatives of the United Mine Workers will diligently co-operate in effectuating a revision which will eliminate the existing inequities."

Tentative Agreement with Maintenance Men

As a safeguard against any serious damage resulting in the event of trouble between the union and the operators, an agreement was signed Aug. 30, by which the maintenance workers, numbering about 3,000, would be exempted from the strike order and permitted to continue at their work of protecting the mines against flood or other damage. By this agreement the men who were working ten to twelve hours a day were put on an eight-hour basis, receiving their old daily wage for eight hours with pro-rata pay for time worked in excess of eight hours.

This means an increase of $1.10 to $1.15 a day for 975 of the men who will remain at work, an increase which the operators conceded in the early days of the Atlantic City conferences when they agreed to abandon the twelve-hour day.

Notice that the operators had agreed to the miners' terms for these men was the first intimation to be made public that they were convinced the men would quit work. On receipt of it the scale committee sent out orders to the local unions specifying the number of men who were to remain at work and the class of work they are to do.

Secretary Davis of the Department of Labor hopes to see the day when there will be no strikes. The consumers of hard coal would be satisfied with a year in which there was no strike of anthracite miners.—*New York Herald.*

51,000,000 Tons of Bituminous Coal in Storage Aug. 1, 44 Days' Supply; 5,000,000 Tons Gain in Month

Soft coal continued to flow into storage during July and on Aug. 1, 1923, commercial consumers had on hand approximately 51,000,000 net tons, according to a survey by the Bureau of the Census and the Geological Survey, under authority of the Federal Fuel Distributor. In comparison with the revised figure for July 1, 1923, this was an increase of 5,000,000 tons. Progress in the building up of stocks from the low point reached on Sept. 1, 1922, owing to drafts on reserves during the strike last summer, has been practically uninterrupted, and in the eleven months that have elapsed there has been a net gain of 29,000,000 tons. Stocks on Aug. 1, 1923, were 10,000,000 tons larger than on Aug. 1, 1921. On the dates for which stock records are available the supply on Aug. 1, 1923, has been exceeded only during the periods at the close of the war and just prior to the miners' strike of 1922.

Measured in terms of tons, stocks increased 10.9 per cent during July; in terms of days' supply, the increase was 18.9 per cent. The larger increase in days' supply was due to the fact that the rate of consumption decreased in July, thereby increasing the length of time the tonnage on hand would last. At the rate of consumption in July the stocks on Aug. 1 were sufficient to last 44 days on the average, assuming that stocks were evenly divided.

Total stocks on the Lake docks at Duluth-Superior, Ashland-Washburn, and at Lake Michigan ports on Aug. 1, 1923, were about 5,361,000 tons. Compared with the 3,991,000 tons on the docks on July 1, this was an increase of approximately 34 per cent. A group of producers who store coal at the mines or at some intermediate point had 672,000 tons in storage on Aug. 1.

Anthracite.—Retail dealers in anthracite received more of that coal than they delivered in July, and their total stocks on Aug. 1 were 4 per cent larger than on July 1. Practically complete reports on the quantity of anthracite on the docks of Lakes Superior and Michigan indicate that the total on hand on Aug. 1 was 609,000 net tons, against 448,000 tons on July 1.

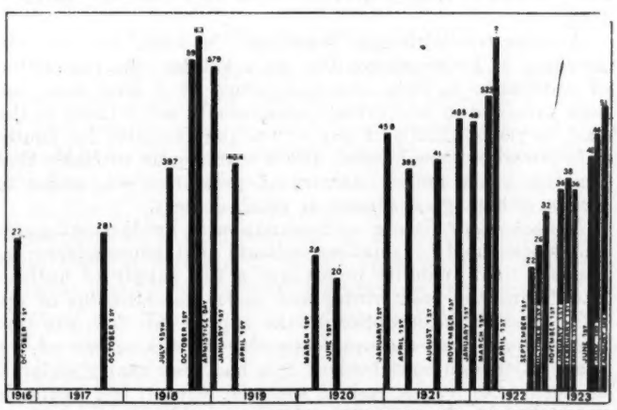


FIG. 1.—TOTAL COMMERCIAL STOCKS OF BITUMINOUS COAL, OCT. 1, 1916, TO AUG. 1, 1923

Figures represent million net tons and include coal in the hands of railroads, industrial consumers, public utilities, and retail dealers. Coal for steamship fuel, Lake docks, in transit, and in the bins of householders is not included. The figures for 1923 are subject to revision.

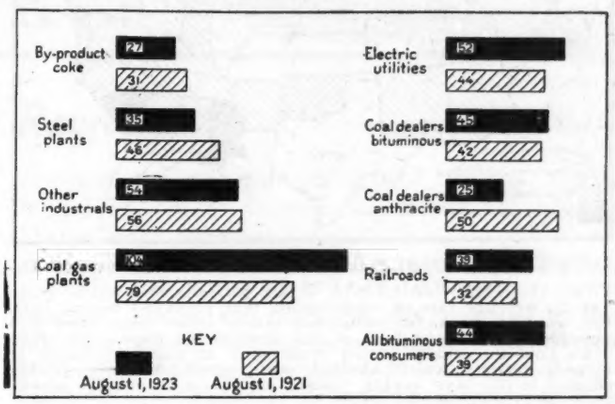


FIG. 2.—DAYS' SUPPLY HELD BY DIFFERENT CLASSES OF CONSUMERS ON AUG. 1, 1923, AND AUG. 1, 1921

At the rate soft coal was burned during July, 1923, the total stocks on Aug. 1 were sufficient to last 44 days, an increase of 7 days over the supply on July 1. The stocks on Aug. 1, 1921, were sufficient to last 39 days at the low rate of consumption then prevailing. An important factor in the increase in days' supply on Aug. 1 was an appreciable decline in the rate of consumption in July.

The total quantity of soft coal in the hands of commercial consumers on Aug. 1, 1923, was between 49,000,000 and 53,000,000 net tons—probably 51,000,000 tons. This estimate does not take into consideration coal in the cellars of householders, concerning which no statistics are available, nor steamship fuel, nor coal on the Lake docks, which item is classed as coal in transit.

Fig. 1 shows that reserves were added to more rapidly during July than in any other month during the present period of accumulation. Stocks have been built up to the point where they exceed by a large margin those on any preceding summer date, and in fact they compare favorably with those on any date for which records exist. The quantity in storage piles on Aug. 1, 1923, was 25 per cent larger than on Aug. 1, 1921; 5 per cent larger than on Nov. 1, 1921, and but 12 per cent behind Jan. 1, 1919, when exceptionally large supplies were on hand.

Estimates based on the reports from consumers and supplemented by other available information indicate that the total quantity consumed in July, including exports, was in the neighborhood of 42,000,000 tons, or at the rate of about 9,250,000 tons per 7-day week.

Consumers' Stocks in Terms of Days' Supply.—Fig. 2, which is based upon the data in the table below, offers a comparison of the days' supply held by the seven principal classes of consumers on Aug. 1, 1923, with that on Aug. 1, 1921. In using that date for comparative purposes it should be carefully noted that in actual tonnage stocks were less then than now, but owing to the low rate of consumption in the summer of 1921, due to the severe industrial depression, the days' supply for certain types of consumers was larger. The average stocks on Aug. 1 were sufficient to last 44 days at the rate of consumption in July, whereas those on Aug. 1, 1921, were sufficient to last 39 days at the rate of consumption from Aug. 1 to Nov. 1 of that dull year.

DAYS' SUPPLY OF BITUMINOUS COAL IN HANDS OF VARIOUS CLASSES OF CONSUMERS, JAN. 1, 1919, TO AUG. 1, 1923 (a)

(Figures represent number of days supply would last at current rate of consumption at time of stock-taking.)

	Jan. 1, 1919	June 1, 1920	Apr. 1, 1921	Aug. 1, 1921	Nov. 1, 1921	Sept. 1, 1922	Nov. 1, 1922	Jan. 1, 1923	Mar. 1, 1923	June 1, 1923	July 1, 1923	Aug. 1, 1923 (b)
Byproduct coke plants	32	8	28	31	38	11	18	19	19	23	26	27
Steel plants	42	11	38	46	46	12	21	27	26	29	35	35
Other industrials	65	24	47	56	67	32	39	40	34	39	46	54
Coal-gas plants	81	22	66	79	87	34	55	60	58	75	89	104
Electric utilities	49	22	48	44	54	26	32	33	34	45	48	52
Coal dealers, bituminous	39	10	26	42	46	11	21	16	11	27	39	45
Railroads	32	10	24	32	31	13	13	16	16	21	28	39
Total bituminous	42	15	36	39	43	17	23	26c	22c	30c	37c	44c

(a) The figures in this table are estimates based on incomplete data. (b) The rate of consumption used in calculating the days' supply on Aug. 1, 1923, was the quantity consumed in July. (c) Subject to revision.

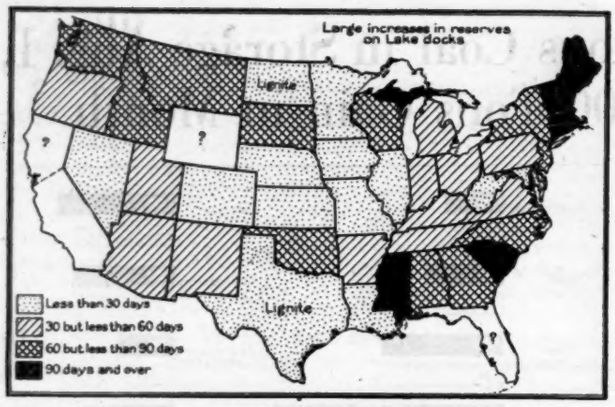


FIG. 3.—DAYS' SUPPLY OF SOFT COAL ON HAND AT INDUSTRIAL PLANTS ON AUG. 1, 1923

At the average rate of consumption that prevailed during July, 1923, reserve stocks at industrial plants other than steel and byproduct coke would last on the average 54 days. The map shows how the supply varied from state to state. Changes in business activity which affected coal consumption are quickly reflected in the days' supply. Based on reports from 2,229 plants.

Stocks, by Localities.—Fig. 3 shows graphically the variation in stocks in each state. The map shows the days' supply held at general industrial establishments, excluding steel and byproduct coke plants.

Over the country as a whole the stocks held by general industrials on Aug. 1 were sufficient to last 54 days on the average, an increase of 8 days over the supply on July 1.

The distribution of stocks as shown by the map does not vary greatly from the customary condition. New England, the most eastern of the Middle Atlantic States, the South Atlantic Coastal Plain, certain of the Gulf States, the Northern Peninsula of Michigan, Wisconsin, and the Northwest were particularly well supplied, and as usual had heavier supplies than the states included in a broad belt through the center of the country from the Atlantic to the Pacific, the lignite-burning states, and those in the upper valley of the Mississippi.

Electric Utilities.—Reports from the electric-utility plants indicated that stocks increased and that the supply on hand on Aug. 1 was sufficient for 52 days, against 48 days' supply on July 1. On Aug. 1, 1921, such plants had enough coal to last 44 days.

Coal-Gas Plants.—The stocks at coal-gas plants increased in July and a new record of stocks at such plants was established, both from the viewpoint of days' supply and tonnage involved. The supply was sufficient to last 104 days, and exceeded stocks on Aug. 1, 1921, by 25 days.

Byproduct Coke and Steel Plants.—Complete returns from the byproduct coke and steel plants showed the following reserves on Aug. 1, 1923, at the rate of consumption in July, and on Aug. 1, 1921:

BYPRODUCT PLANTS	Days' Supply Aug. 1, 1923	Days' Supply Aug. 1, 1921	STEEL WORKS	Days' Supply Aug. 1, 1923	Days' Supply Aug. 1, 1921
Low-volatile....	27	Separation	Steam coal.....	31	36
High-volatile...	27	not possible	Gas coal.....	42	61
Average.....	27	31	Average.....	35	46

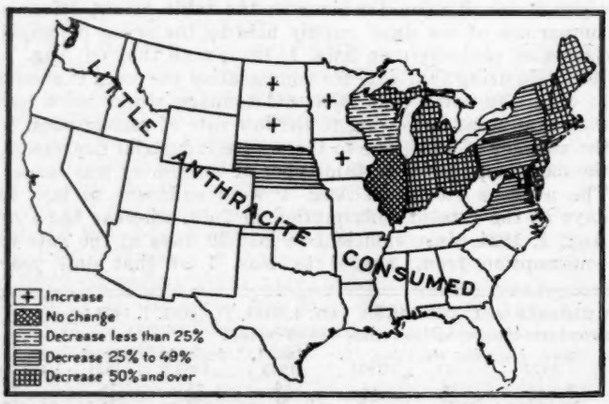


FIG. 4.—HOW RETAILERS' STOCKS OF ANTHRACITE ON AUG. 1, 1923, COMPARED WITH THOSE ON AUG. 1, 1921

Stocks of anthracite in retail yards increased 4 per cent during July. The supply on Aug. 1 was sufficient to last on the average 25 days at the rate of delivery in July. The map shows how stocks on Aug. 1, 1923, compared with those on the corresponding date 2 years ago. Only in a portion of the territory served by the Lake docks did the supply on Aug. 1, 1923, exceed that on the earlier date.

Railroad Fuel.—Estimates of railroad-fuel stocks, based on reports submitted by the American Railway Association, place the total quantity held by the railroads in stockpiles, cars and chutes, on Aug. 1, at 13,800,000 tons, a supply sufficient for 39 days. In comparison with July 1 this was an increase in days' supply of 39 per cent.

Retail Dealers, Bituminous.—Deliveries of soft coal by retail dealers decreased in July, the average rate being 9 per cent less than that during June. Receipts somewhat exceeded deliveries and on Aug. 1, 1923, retailers had a supply sufficient to last 45 days, against a 39 days' supply on July 1. On Aug. 1, 1921, they had enough for 42 days. The actual tonnage held by retailers on Aug. 1, 1923, was 12 per cent less than on Aug. 1, 1921, and 20 per cent less than on Nov. 1 of that year.

All available information indicates that during July there was a comparatively small decrease in the quantity of bituminous coal in transit, which probably did not exceed 4,000,000 tons.

Coal on Upper Lake Docks.—Practically complete reports show that stocks on the docks of Lakes Superior and Michigan increased from 3,991,000 tons on July 1 to 5,361,000 tons on Aug. 1, 1923. On Aug. 1, 1921, the total was 8,139,000 tons.

Unbilled Loads at Mines.—The quantity of unbilled coal in cars standing at the mines and the tonnage at junction points and terminals changed but little in July, and on Aug. 1 stood at 560,000 and 27,000 tons, respectively.

Bituminous Coal Stored by Producers.—Reports from an incomplete list of producers show that on Aug. 1 672,000 tons of bituminous coal were on hand at the mines or at some intermediate point between the mines and centers of consumption. On July 1 690,000 tons were so held.

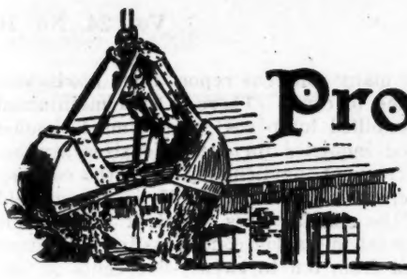
Stocks of Coke at Byproduct Coke Plants.—Byproduct coke plants continued to accumulate stocks during July and the total surplus coke on hand on Aug. 1 was 430,000 tons. This was an increase over the supply on July 1 of 122,000 tons, or nearly 40 per cent. In spite of the increase, however, stocks on Aug. 1 were not quite half those on March 1, 1922.

Anthracite.—Although somewhat lessened by the observance of Independence Day as a holiday, the production of anthracite in July was maintained at a level that has been exceeded in the corresponding month but 3 times in the past 10 years. Little, if any, of the sizes suitable for household purposes were burned, and it seems quite probable that practically the entire quantity of such sizes was added to stocks, either by consumers or retail dealers.

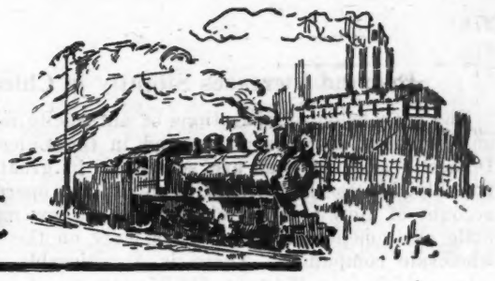
Householders' Stocks.—Examination of production figures and stocks held by retailers indicate that householders remember their inability to procure a full supply of anthracite during the past winter and under the stimulus of another possible interruption in the supply this fall, are laying in more than the usual quantity at this season of the year. Although householders' bins had been nearly stripped of anthracite at the end of the past winter, the available production has been taken by them so rapidly, it seems likely that many homes are now well stocked.

Retail Dealers' Stocks.—The stocks of anthracite in retail coal yards on Aug. 1, 1923, though 10 per cent larger than on July 1, were much lower than during the summer of preceding years, largely because of the rapidity with which coal has been taken by the consumers. It has not been possible for the government to make a complete count, but a selected list of 424 dealers from whom reports have been received since 1919 shows total stocks of 827,711 tons on Aug. 1, against 793,841 tons on July 1, 1923. These dealers had 47 per cent less anthracite on hand than on Aug. 1, 1921, and 13 per cent less than on Jan. 1, 1919.

Anthracite in Transit.—According to reports from the dock operators, there were 608,726 net tons of anthracite on the Upper Lake Docks on Aug. 1, 1923, compared with 1,090,258 tons on Aug. 1, 1921; 1,316,070 tons on Nov. 1, 1921, and 447,610 tons on July 1, 1923.



Production and the Market



Weekly Review

Stoppage of work in the hard-coal fields has caused no marked change in the market. Inquiries have increased, but prices in the East have not gained. Up to the last day before the strike began anthracite was produced at a record rate. In the week before the strike the output was the highest recorded this year for both hard and soft coal. There will be no active demand for soft-coal substitutes until cooler weather and if the railroads continue to perform as well as they have for the past eight months there is little likelihood of price inflation.

Production of anthracite to date for the present coal year is estimated at approximately 41,400,000 net tons, 2,824,000 tons more that during the corresponding period of 1921 and 2,380,000 tons more than during the same period of 1920. During the week ended Aug. 25 hard-coal miners produced 2,165,000 net tons, an increase of 207,000 tons over the preceding week.

The government's stock report on Sept. 1, shows 51,000,000 tons of bituminous coal in the hands of consumers as of Aug. 1, a gain in July of 5,000,000 tons. Production of soft coal in July was 45,000,000 tons. Consumption and exports were 40,000,000 tons. Production in August was around 48,500,000 tons, which indicates a further gain of stocks in August of between six and eight million tons, bringing the total on Sept. 1 to around 57,000,000 tons.

Price Index Advances Slightly

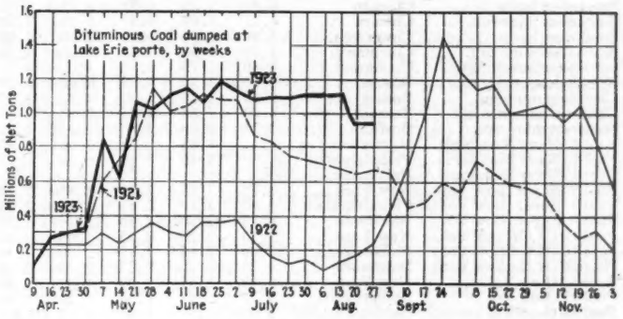
There was another slight advance in soft coal last week, *Coal Age* Index registering 204 on Sept. 4, a gain of two points, with an average price of $2.47. Prices throughout the West showed slight increases, while in the East they remained practically unchanged.

In the Chicago market domestic coals are in better demand due in part possibly to the anthracite suspension and on account of recent slow buying, while the busiest market marked by the heaviest buying since the first of the year, due to a few days of cool weather, is reported in the steam-coal market. In New England buyers showed no interest, practically all industries having heavy reserves.

The market for substitutes gained strength during the week, particularly coke. Inquiries were more numerous and considerable business was reported as having been placed. Prices were stronger. While some producers of bituminous screened coals reported active business and claimed to be sold up at present, others asserted that while inquiries were numerous actual business was slow.

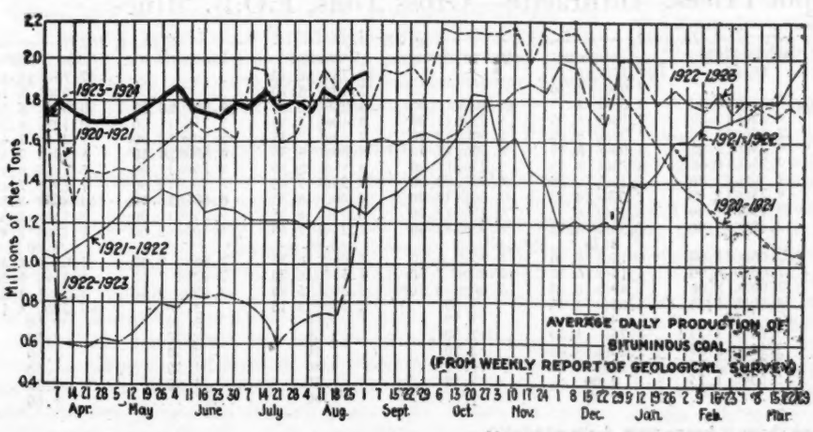
Lake shipments of bituminous coal continues at about 1,000,000 net tons weekly. Congestion at the upper lake ports continues. Shipments of anthracite from Buffalo during the present season to Aug. 28 amount to 1,903,170 net tons, as compared with 2,637,463 tons in the corresponding period of 1922.

The export demand is quiet, although it is expected that increased buying will soon follow as the result of the Italo-Greek trouble.



LAKE COAL DUMPED
(Net Tons)

	Week Ended Aug. 27	Season to Aug. 27
Cargo	927,382	17,882,549
Fuel	59,024	918,852
Totals	986,406	18,801,401



Estimates of Production

(Net Tons)

	1922	1923
BITUMINOUS		
Aug. 11 (a)	4,606,000	9,851,000
Aug. 18 (a)	4,609,000	10,843,000
Aug. 25 (b)	6,736,000	11,346,000
Daily average	768,000	1,807,000
Calendar year	223,559,000	357,036,000
Daily av. cal. year	1,109,000	1,891,000
ANTHRACITE		
Aug. 11	40,000	1,735,000
Aug. 18	38,000	1,858,000
Aug. 25	37,000	2,165,000
COKE		
Aug. 18 (b)	120,000	334,000
Aug. 25 (a)	116,000	318,000
Calendar year	4,086,000	12,843,000

a) Subject to revision. (b) Revised from last report.

Demand Increases Slightly in Chicago

The suspension of operations of anthracite mines caused only a slight increase of demand in the Chicago market. Domestic sizes of coal are somewhat in greater demand, possibly due to the anthracite mines not operating or on account of slow buying during the past few months. The little excitement that prevails is more on the part of the wholesale companies. There is a noticeable demand for coke, which is selling at $10.75 per ton f.o.b. ovens in Chicago, which is readily supplied.

The busiest market marked by heaviest buying since the first of the year is the situation as regards bituminous coal in Chicago and the surrounding district last week. A few days of low temperature brought realization that winter is approaching and made all interests, domestic and industrial, look to their coal supply. The promptitude with which the market absorbed all offerings practically eliminated bargain coal and prices from all fields held firmly, with many indications of an upward trend.

A heavy demand for screenings is being experienced by southern Illinois producers. Circular prices are being adhered to rigidly and many concerns report their production as sold for some time to come. There is still maintained a large volume of unbilled lump coal at the mines loaded on cars. Orders and inquiries for domestic sizes are becoming much more frequent, particularly from the country districts and the circular price of $4.35 is being held strongly, except on the smaller sizes Central Illinois felt the general improvement in market conditions to that extent that prices advanced from ten to twenty-five cents on the various grades of coal.

In the DuQuoin and Jackson County fields price range from $3.25 to $3.50 on domestic lump and egg, domestic nut being offered at $2.75@$3 and screenings at $1.30@ $1.40. In the Mt. Olive field demand increased and as a consequence prices have advanced 25c. per ton on domestic sizes. Conditions in the Standard field have improved materially and most operators have advanced their prices over those of the previous week.

Retail Market at St. Louis Improves

An improvement in retail conditions has been noted during the past week in St. Louis. The early demand for

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern	Market Quoted	Sept. 5 1922	Aug. 20 1923	Aug. 27 1923	Sept. 1 1923†
Smokeless lump	Columbus	$6.10	$5.85	$5.85	**$5.75@$6.15**
Smokeless mine run	Columbus	5.50	3.00	3.00	2.75@ 3.25
Smokeless screenings	Columbus	5.35	2.35	2.35	2.25@ 2.50
Smokeless lump	Chicago	6.40	5.75	6.35	6.25@ 6.50
Smokeless mine run	Chicago	6.25	3.00	3.35	3.25@ 3.50
Smokeless lump	Cincinnati	5.60	6.10	6.10	**6.00@ 6.50**
Smokeless mine run	Cincinnati	4.75	3.00	3.25	3.00@ 3.50
Smokeless screenings	Cincinnati	4.40	2.75	2.75	*2.25@ 2.75*
*Smokeless mine run	Boston	9.00	5.30	5.05	**5.00@ 5.25**
Clearfield mine run	Boston	5.00	2.35	2.20	1.90@ 2.50
Cambria mine run	Boston	6.00	2.85	2.85	2.50@ 3.25
Somerset mine run	Boston	5.25	2.60	2.50	2.25@ 2.75
Pool 1 (Navy Standard)	New York	.....	3.05	3.25	3.00@ 3.50
Pool 1 (Navy Standard)	Philadelphia	.....	3.40	3.10	*2.95@ 3.25*
Pool 1 (Navy Standard)	Baltimore	.....	.....	.....	.....
Pool 9 (Super. Low Vol.)	New York	5.75	2.55	2.50	**2.35@ 2.75**
Pool 9 (Super. Low Vol.)	Philadelphia	5.85	2.75	2.55	**2.45@ 2.75**
Pool 9 (Super. Low Vol.)	Baltimore	6.25	2.50	2.50	*2.40@ 2.50*
Pool 10 (H.Gr.Low Vol.)	New York	5.35	2.20	2.25	2.00@ 2.50
Pool 10 (H.Gr.Low Vol.)	Philadelphia	5.60	2.30	2.15	2.00@ 2.35
Pool 10 (H.Gr.Low Vol.)	Baltimore	5.85	2.25	2.25	2.25@ 2.30
Pool 11 (Low Vol.)	New York	5.10	1.85	2.00	1.80@ 2.00
Pool 11 (Low Vol.)	Philadelphia	5.10	1.85	1.80	*1.75@ 2.00*
Pool 11 (Low Vol.)	Baltimore	5.35	1.90	1.90	1.90
High-Volatile, Eastern					
Pool 54-64 (Gas and St.)	New York	5.15	1.75	1.75	*1.60@ 1.85*
Pool 54-64 (Gas and St.)	Philadelphia	4.75	1.75	1.80	**1.70@ 2.00**
Pool 54-64 (Gas and St.)	Baltimore	5.25	1.85	1.85	1.85
Pittsburgh sc'd gas	Pittsburgh	.....	2.80	2.90	**2.80@ 3.10**
Pittsburgh gas mine run	Pittsburgh	.....	.....	2.45	**2.45@ 2.60**
Pittsburgh mine run (St.)	Pittsburgh	.....	2.05	2.20	**2.25@ 2.35**
Pittsburgh slack (Gas)	Pittsburgh	.....	1.55	1.55	1.50@ 1.60
Kanawha lump	Columbus	5.85	3.00	3.05	2.85@ 3.25
Kanawha mine run	Columbus	5.60	1.85	1.85	**1.75@ 2.10**
Kanawha screenings	Columbus	5.35	1.05	1.05	**1.10@ 1.25**
W. Va. lump	Cincinnati	5.35	3.25	3.50	**3.50@ 3.75**
W.Va. Gas mine run	Cincinnati	5.35	1.70	1.75	**1.65@ 2.00**
W. Va. Steam mine run	Cincinnati	5.35	1.70	1.75	**1.65@ 2.00**
W. Va. screenings	Cincinnati	4.85	1.05	1.20	**1.25@ 1.50**
Hocking lump	Columbus	6.25	2.75	2.75	2.50@ 3.00
Hocking mine run	Columbus	5.25	1.85	1.85	1.75@ 2.00
Hocking screenings	Columbus	5.25	1.10	1.10	1.00@ 1.20
Pitts. No. 8 lump	Cleveland	5.50	2.60	2.65	**2.35@ 3.00**
Pitts. No. 8 mine run	Cleveland	5.25	2.05	2.10	2.10@ 2.15
Pitts. No. 8 screenings	Cleveland	5.25	1.20	1.35	**1.30@ 1.45**

Midwest	Market Quoted	Sept. 5 1922	Aug. 20 1923	Aug. 27 1923	Sept. 1 1923†
Franklin, Ill. lump	Chicago	$5.05	$3.90	$4.20	**$4.00@$4.35**
Franklin, Ill. mine run	Chicago	4.65	2.85	3.00	2.75@ 3.25
Franklin, Ill. screenings	Chicago	4.25	1.65	1.65	**1.75@ 1.85**
Central, Ill. lump	Chicago	4.95	2.60	2.60	**3.00@ 3.25**
Central, Ill. mine run	Chicago	4.50	2.10	2.20	2.10@ 2.35
Central, Ill. screenings	Chicago	4.30	1.35	1.40	1.35@ 1.50
Ind. 4th Vein lump	Chicago	5.25	3.35	3.35	3.25@ 3.50
Ind. 4th Vein mine run	Chicago	4.85	2.60	2.60	2.50@ 2.75
Ind. 4th Vein screenings	Chicago	4.75	1.55	1.55	**1.50@ 1.75**
Ind. 5th Vein lump	Chicago	5.10	2.75	2.75	2.50@ 3.00
Ind. 5th Vein mine run	Chicago	4.65	2.10	2.10	2.00@ 2.25
Ind. 5th Vein screenings	Chicago	4.40	1.40	1.40	1.30@ 1.50
Mt. Olive lump	St. Louis	.....	3.00	3.00	**3.00@ 3.25**
Mt. Olive mine run	St. Louis	.....	2.00	2.00	**2.20@ 2.30**
Mt. Olive screenings	St. Louis	.....	1.50	1.50	*1.35*
Standard lump	St. Louis	4.65	2.40	2.50	**2.50@ 2.75**
Standard mine run	St. Louis	3.90	1.85	1.85	**1.80@ 2.30**
Standard screenings	St. Louis	3.75	1.00	1.00	1.00
West Ky. lump	Louisville	4.25	2.20	2.40	**2.40@ 2.75**
West Ky. mine run	Louisville	4.25	1.75	2.10	*1.85@ 2.00*
West Ky. screenings	Louisville	4.25	0.90	1.05	*0.80@ 1.00*
West Ky. lump	Chicago	4.25	2.10	2.75	2.50@ 3.00
West Ky. mine run	Chicago	4.25	1.30	1.60	**1.50@ 2.00**
South and Southwest					
Big Seam lump	Birmingham	4.75	3.50	3.50	**3.65@ 3.90**
Big Seam mine run	Birmingham	4.00	1.95	1.95	1.75@ 2.15
Big Seam (washed)	Birmingham	4.00	2.35	2.35	2.25@ 2.50
S. E. Ky. lump	Chicago	4.25	3.10	3.10	2.75@ 3.00
S. E. Ky. mine run	Chicago	4.25	1.80	1.80	1.60@ 2.00
S. E. Ky. lump	Louisville	5.00	2.85	3.00	**2.75@ 3.50**
S. E. Ky. mine run	Louisville	5.00	1.85	1.85	**1.75@ 2.25**
S. E. Ky. screenings	Louisville	4.90	1.00	1.10	**1.00@ 1.40**
S. E. Ky. lump	Cincinnati	5.50	3.25	3.25	**3.50@ 4.00**
S. E. Ky. mine run	Cincinnati	5.25	1.60	1.70	**1.50@ 2.10**
S. E. Ky. screenings	Cincinnati	4.85	1.05	1.15	**1.10@ 1.85**
Kansas lump	Kansas City	6.00	4.00	4.50	4.50
Kansas mine run	Kansas City	5.00	3.25	3.50	3.50
Kansas screenings	Kansas City	2.60	2.60	2.60	2.50@ 2.75

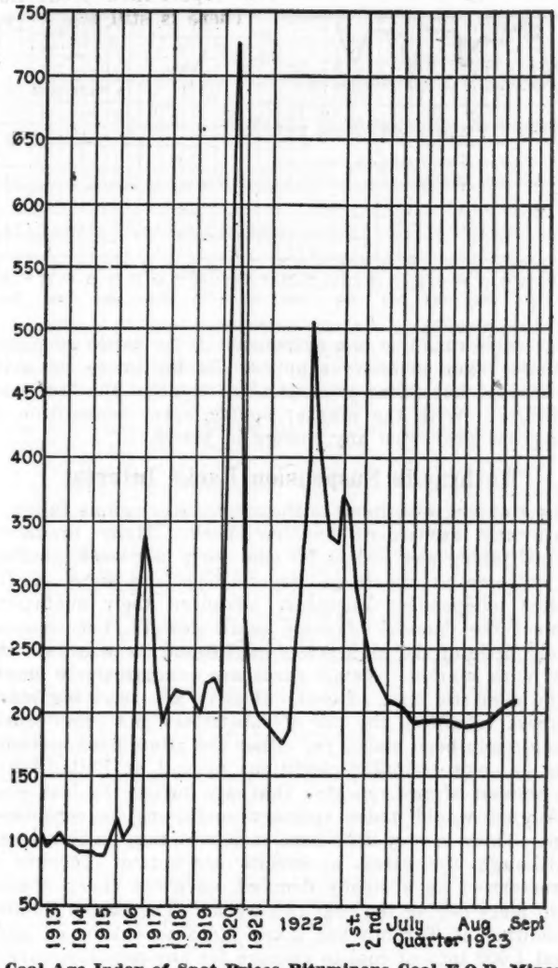
* Gross tons, f.o.b. vessel, Hampton Roads.

† Advances over previous week shown in **heavy type**, declines in *italics*.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Dec. 26, 1922 Independent	Dec. 26, 1922 Company	Aug. 27, 1923 Independent	Aug. 27, 1923 Company	Sept. 1, 1923† Independent	Sept. 1, 1923† Company
Broken	New York	$2.34	$9.00	$7.75@$8.25	.....	$7.75@$8.35	.....	$7.75@$8.35
Broken	Philadelphia	2.39	.....	7.90@ 8.10	.....	7.90@ 8.10	.....	7.90@ 8.10
Egg	New York	2.34	9.25@12.00	8.00@ 8.35	$8.50@13.00	8.00@ 8.35	**$8.50@14.00**	8.00@ 8.35
Egg	Philadelphia	2.39	9.25@11.00	8.10@ 8.35	9.25@11.00	8.10@ 8.35	9.25@11.00	8.10@ 8.35
Egg	Chicago*	5.06	12.50@13.00	7.20@ 8.25	8.50@12.00	7.25@ 7.45	8.50@12.00	7.25@ 7.45
Stove	New York	2.34	9.25@12.00	8.00@ 8.35	8.50@13.50	8.00@ 8.35	**8.50@14.50**	8.00@ 8.35
Stove	Philadelphia	2.39	9.25@11.00	8.15@ 8.35	9.25@11.00	8.15@ 8.35	9.25@11.00	8.15@ 8.35
Stove	Chicago*	5.06	12.50@13.00	7.35@ 8.25	8.50@12.00	7.25@ 7.45	8.50@12.00	7.25@ 7.45
Chestnut	New York	2.34	9.25@12.00	8.00@ 8.35	8.50@13.00	8.00@ 8.35	**8.50@14.00**	8.00@ 8.35
Chestnut	Philadelphia	2.39	9.25@11.00	8.15@ 8.35	9.25@11.00	8.15@ 8.35	9.25@11.00	8.15@ 8.35
Chestnut	Chicago*	5.06	12.50@13.00	7.35@ 8.35	8.50@12.00	7.25@ 7.45	8.50@12.00	7.25@ 7.45
Range	New York	2.34	.....	8.25	.....	8.30	.....	8.30
Pea	New York	2.22	7.00@11.00	6.15@ 6.30	6.75@ 8.50	6.00@ 6.30	**7.50@ 9.00**	6.00@ 6.30
Pea	Philadelphia	2.14	7.00@ 8.00	6.15@ 6.20	7.00@ 7.50	6.15@ 6.20	7.00@ 7.50	6.15@ 6.20
Pea	Chicago*	4.79	7.00@ 8.00	5.49@ 6.03	7.00@ 8.50	5.30@ 5.65	7.00@ 8.50	5.30@ 5.65
Buckwheat No. 1	New York	2.22	4.00@ 5.00	4.00@ 4.10	3.50	3.50@ 4.15	3.50	3.50@ 4.15
Buckwheat No. 1	Philadelphia	2.14	5.00	4.00	3.50	3.50	3.50	3.50
Rice	New York	2.22	3.00@ 3.25	2.75@ 3.00	2.50	2.50	2.50	2.50
Rice	Philadelphia	2.14	2.50@ 2.75	2.75@ 3.00	2.50	2.50	2.50	2.50
Barley	New York	2.22	1.75@ 2.00	1.50@ 2.00	1.50	1.50	1.50	1.50
Barley	Philadelphia	2.14	1.00@ 1.75	2.00	1.50	1.50	1.50	1.50
Birdseye	New York	2.22	.....	2.10	.....	1.60	.....	1.60

* Net tons, f.o.b. mines. † Advances over previous week shown in **heavy type**, declines in *italics*.



Coal Age Index of Spot Prices Bituminous Coal F.O.B. Mines

	1923			1922
	Sept. 1	Aug. 27	Aug. 20	Sept. 5
Index	204	202	197	420
Weighted average price	$2.47	$2.44	$2.38	$5.08

This diagram shows the relative, not the actual, prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

anthracite seems to have been taken care of and since the dealers have ample stocks of this grade of fuel on hand, the probability of a strike is not causing consumers any worry. There is a fair demand for coke, but smokeless is not moving in any quantity.

Quotations in western Kentucky have advanced 10c. to 25c. a ton on prepared sizes over the past ten days, but actual sales are not much higher if any than they have been. Operators are very anxious to obtain higher prices and believe that September will bring better levels.

Prices Higher at Louisville

Prices quoted on the Louisville market on both eastern and western Kentucky coal are higher, but there is still plenty of coal to be had at about the old levels. Steam coal shows very little change, except some fluctuation in screenings. Domestic coal is generally in fair movement. The Lake movement is still good, while there has been scattered demand from various sections.

Anthracite has been moving readily at Minneapolis. There is always a pickup in the hard-coal movement at this time, and it has been increased by the suspension. Retail dealers have been receiving as many orders as they could comfortably handle, but apparently there has been no serious alarm. Consumers feel assured that they will be able to get fuel. The docks have received something like 800,000 tons of hard coal this season, about 300,000 tons more than last year. While this is not a full winter's supply, it is around 70 or 75 per cent of a winter's needs.

The soft-coal situation is steady. Dock Hocking is selling at $6 and occasionally $5.75. Youghiogheny is about $6@$6.25. Screenings are around $3, all prices being at the dock.

Market Stiffens at Duluth

Possibility of a strike had a stiffening effect upon all markets at Duluth. Bituminous advanced generally over last week's quotations and hard coal is the same as before quoted only because of the fact that dock men have announced their intention of maintaining prices "strike or no strike."

Hard-coal prices follow: Stove, $12.80; nut, $12.85; egg, $12.50; pea, $11; buckwheat, $8.50.

It is estimated that there is about 4,000,000 tons of bituminous on the docks at Duluth. Railroads, industrial concerns and manufacturing plants are all placing orders.

Prices of bituminous are as follows: Youghiogheny, lump, $6.50; run of pile, $5.50; screenings, $4.25; Hocking, lump, $6.25; run of pile, $5.25; screenings, $3.75; Splint, lump, $6.75; run of pile, $5.75; screenings, $4.75; Pocahontas, lump, $10.00; run of pile, $6.75; screenings, $6.25; Kentucky, lump, $8.00; run of pile, $7.25; screenings, $4.75. Three docks here have stopped shipping anthracite to points outside of Duluth.

The coal market at Milwaukee is active, as far as the domestic field is concerned, but there is not much doing in industrial circles. Consumers of anthracite and the domestic grades of bituminous coal are inclined to be panicky, in view of the uncertainty of future anthracite mine operations, and dealers are pressed with orders. Up to the present time Milwaukee has received only about 50 per cent of a normal supply of anthracite, and the greater part of this is now in the bins of consumers.

The demand for Kansas, Oklahoma and Missouri coal took a pronounced spurt the last week of August. While no new mines were reported opening, those in operation worked almost full time. Mine tracks have been almost cleared of "no bills." Some operators in the Arkansas field advanced the price of semi-anthracite lump 50c. a ton, to $7, Sept. 1.

Both operators and dealers in Utah report a gain in business. Buyers from Pacific Coast, Northwest and Midwest points are in Salt Lake City making inquiries for coal. Railroads running through the state are storing coal and local industries are buying again, though not heavily. The increase in the domestic trade is marked.

Dealers throughout the Rocky Mountain region have their yards and bins full and consumers are commencing to put in their winter supply. September prices for bituminous are $6 for lump and $5.50 for nut, an increase of 25c. per ton over August prices. Mine run is selling at $4.25@$4.50, slack $2.25@$2.50 for Walsen and $3.25@$3.50 for Trinidad. Semi-anthracite in the egg and nut sizes is quoted at $7.50, chestnut at $3. Bee-hive foundry coke is selling at $9.50 and byproduct at $9 per ton. Lignite prices are now quoted at $4, $3 and $2.25. Mine-run is selling at $2.50 and slack at $1.50.

Ohio Dealers Show Anxiety

Retail dealers in central Ohio showed more anxiety about stocks of domestic coal and householders exhibited some concern about their winter's coal. Contracting for domestic lump is active although sellers are loath to engage fuel for any great length of time in the future, believing that the suspension in the anthracite fields will mean advanced quotations on domestic sizes. The hard-coal situation has not reflected so far on the steam coal conditions. Buyers are playing a waiting game. Reserves are sufficient for from sixty to ninety days, while railroad demands are not as large as formerly.

Quotations stiffened in the Cincinnati market as a result of the anthracite situation. The September circular on the low-volatile coals shows little of a startling nature after all the talk that has been made regarding this coal being

sent to New England to take the place of anthracite. However, brokers are asking an advance of 25 to 50c. over the circular and most of the producers say they have plenty of orders or contracts to take their entire output from Sept. 15 to Oct. 15 at the present rate of production, which is about three days a week in the Pocahontas field.

Demand is showing marked improvement at Cleveland. The anthracite situation has not only stimulated steam buying but domestic as well. While the railroads have not increased the quantity of coal they are taking the proportion of eastern Ohio coal going to them is estimated at between 40 and 50 per cent. Operators and jobbers say inquiries are more numerous.

Pittsburgh Prices Move Upward

The Pittsburgh district coal market moved up an average of about 10c. a ton in the last week. The advance occurred without there being any particular change in either production or demand. Of late there has been a close balance, and apart from the fact of many small mines are closed the operation of the district has been very close to capacity. On this account it does not take much to move the market upward.

In the trade the advance is commonly attributed to the anthracite situation.

Buyers in New England Show No Interest

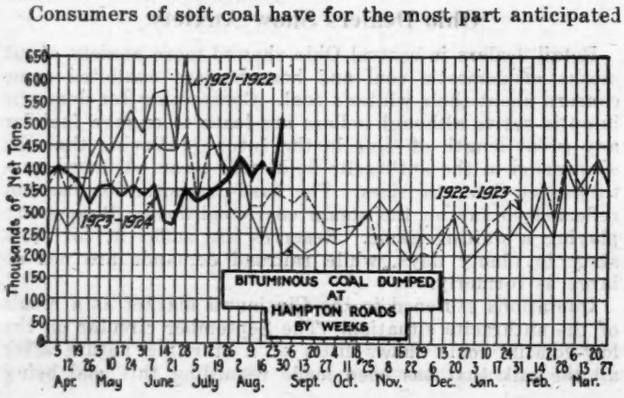
Not even the anthracite controversy in giving the slightest impetus to steam trade in New England. Buyers show no interest whatever and if possible there have been fewer purchases the past week than the week previous. Practically all the industries have coal accumulated for the fall and winter and it would take a very material increase in consumption to justify more than scattering inquiry.

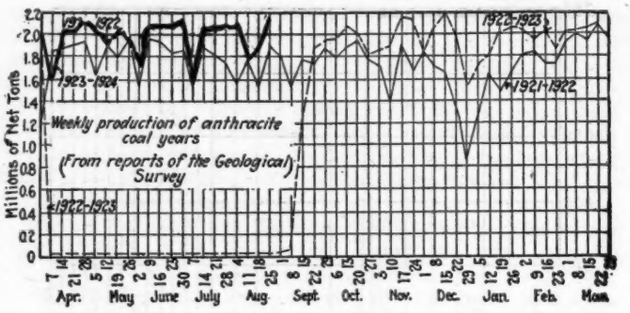
The central Pennsylvania mines are under heavy curtailment, and aside from their tonnage on season contracts there is relatively little coal moving. The railroads are shutting off a percentage of their supply and in no direction is there improvement looked for until well into the autumn. Even miners of the more favorably known grades are pressed to keep in operation and in a few cases where there have been large accumulations at tidewater piers concessions have been made to dispose of the coal.

Prices f.o.b. vessel at Hampton Roads range about the same as a week ago. No. 1 Navy standard grades have been quoted freely at $5@$5.20, and No. 2 coals have been offered down to $4.80. For inland delivery from points like Providence and Boston the asking price is around $6.75 per gross ton on cars, although in certain instances sales have been made at as low as $6.35. At certain of the Hampton Roads terminals there is more coal on wheels than market conditions justify, but at this end there is almost no distress coal, shippers having taken pains to provide alternative disposition before boats were loaded.

In the East the suspension of the hard-coal mines had no material effect on the bituminous-coal situation. There were a few more inquiries, but prices remained on the same level. The market for screened or prepared bituminous coal at New York and Philadelphia is flat, but there is a better inquiry for coke. There is, however, no rush to place orders, although shippers of coke report having received considerable business.

Consumers of soft coal have for the most part anticipated


1921-1922
1922-1923
1923-1924
BITUMINOUS COAL DUMPED AT HAMPTON ROADS BY WEEKS
Thousands of Net Tons
Apr. May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar.


1921-1922
1922-1923
1923-1924
Weekly production of anthracite coal years
(From reports of the Geological Survey)
Millions of Net Tons
Apr. May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar.

any possible rush due to a suspension in the hard-coal mines and have taken in heavy supplies. At Baltimore the soft-coal market has failed to react as a result of the hard-coal conditions. With the market spotty keen competition in selling has prevented any change in prices.

Anthracite Suspension Lacks Interest

The stopping of mining in the anthracite regions failed to create any excitement in New York. Many producers stopped taking new orders for coal early last week, pending the outcome of the wage negotiations and some of the smaller independent operators advanced their quotations to meet the demand of some retail dealers, but comparatively little of the high-priced coal found its way into the New York market. Retail yards are comparatively empty of the domestic sizes of coal. Dealers are receiving many inquiries regarding the use of substitutes and some orders have already been placed for either the bituminous screened coals or coke. Similar conditions prevail at Philadelphia. The amount of coal reaching that city during the last week in August would under ordinary conditions be considered large. There is very little hard coal in storage in Baltimore.

Although the retail anthracite market at Toronto is characterized by a steady demand, no great changes have taken place during the past two weeks. The School Finance Committee of Toronto has taken steps to obtain an additional 1,000 tons of coal to prepare for any possible scarcity which might result from a strike. It is expected that a quantity of Welsh coal will be imported by various firms during the coming winter. Prices remain unchanged, anthracite selling at $15.50, Pennsylvania smokeless at $6.75, and steam lump at $6.90.

Coke Market Improves

The Connellsville coke market presented a mixed movement in the past week as to prices. There is a better feeling as to heating coke, on account of the anthracite situation, and a lessened interest on the part of blast furnaces on account of the continued light demand for pig iron and the uncertain prospects in steel.

Heating coke is very strong, ranging from $4.50 to $4.65. There has been buying by Eastern dealers, and while the total tonnage taken in the week is very moderate the buying, being coupled in the minds of operators with the anthracite situation, has made the operators very firm.

Spot and prompt furnace coke is quoted firm this week at $5. September coke, furthermore, has shown a little weakening, since a week ago it was quoted generally at $5, and one contract, for a particularly good brand, had been made at $5.15. Now, however, a contract for standard coke for September has gone through at $4.75.

At New York egg, stove and nut sizes of coke was quoted at $6.75 to $8 and run of oven $4.75 to $5.25. There was considerable inquiry and some orders placed.

Car Loadings, Surplusages and Shortages

	Cars Loaded — All Cars	Cars Loaded — Coal Cars
Week ended Aug. 18, 1923	1,035,741	189,073
Previous week	973,162	177,259
Same week in 1922	846,266	81,451

	Surplus Cars — All Cars	Surplus Cars — Coal Cars	Car Shortage	
Aug. 22, 1923	74,917	5,498	7,690	3,674
Same date in 1922	120,961	96,405	.....	.....
Aug. 14, 1923	78,404	6,293	8,315	4,193

Foreign Market And Export News

Anthracite Suspension Excites Cardiff Market; Foreign Business Slow

The effect of the suspension in the anthracite mines in the United States has been felt at Cardiff, says a newspaper dispatch. The market on Saturday was excited, although no definite orders for coal, as the result of the suspension, had been received. Otherwise, the Welsh coal trade is more or less unsettled, and business on the whole is quiet. Much of this slackness is due to the European exchanges, which means that many of the most regular of the customers in the Welsh markets are forced to hold back contracts on account of the unfavorable state of their currency. Belgium is at present the most active of the Continental buyers, and several orders are coming through. Both business and inquiry with France and Italy is unusually quiet. The German business continues to be fairly low, but a certain amount is coming through Holland, probably on German account. There is no sign of despondency among the Welsh operators, many of whom have sold out their September outputs.

Prices in Newcastle have declined without any corresponding increase in the volume of business. Coal prices are falling and the European business is slow. The one bright spot in the Newcastle market is in the coke sections, especially in gas coke, where inquiries from home and abroad are numerous, and prices are very firm. On the whole the North of England market is stagnant.

Output of coal during the week ended Aug. 18 was 5,124,000 tons, an increase of 1,588,000 tons as compared with the previous week, which was broken by a holiday, and 130,000 tons less than the week ended Aug. 4.

Hampton Roads Market Firmer

The market at Hampton Roads was firmer last week, with dumpings at normal. Coal movement generally showed a slight increase. The trade appeared somewhat uneasy over developments in the coal strike situation.

Domestic dealers were making every effort to stock up against emergency and reported about 40 per cent of the winters' supply of fuel already delivered to consumers, or contracted to be delivered. Export business was holding its own, with coastwise trade slightly better.

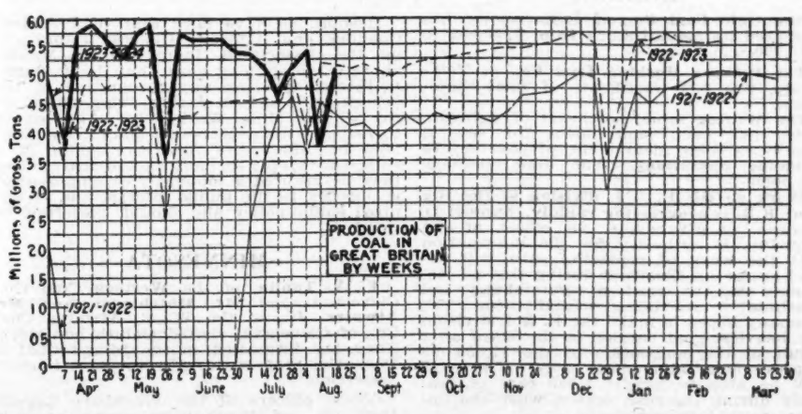
The outlook was bright for increased business in the event the miners' difficulties are settled satisfactorily. The trade was optimistic over the winter's business, preparing for increased export trade and making preparations for heavy coastwise movements.

French Output, Imports and Exports

Statistics showing that France produced, exported and imported more coal during the first six months of 1923, than during the corresponding period of 1922 have recently been made public. They follow in metric tons:

	1923	1922
COALS		
Output	18,093,100	15,560,400
Imports	12,353,000	11,335,000
	30,446,100	26,895,400
Exports	1,198,000	621,000
	29,248,100	26,274,400
COKE		
Output	882,100	464,300
Imports	1,700,000	1,429,000
	2,582,100	2,893,300
Exports	190,000	222,000
	2,392,100	2,671,300
PATENT-FUEL		
Output	1,465,800	1,295,200
Imports	388,000	750,000
	1,853,800	2,045,200
Exports	135,000	49,000
	1,718,800	2,605,000

The production of independent coke-ries, it was pointed out, are not included in the figures showing the amount of coke produced, nor is the production of works independent of collieries included in the figures showing the amount of patent fuel produced.



French Coal Trade Quiet

Business was quiet in France last week on account of the Assumption holiday, however, there was better demand; the retailers wishing to replenish their stocks before winter, and the industrialists endeavoring to secure French coals to avoid the high rates of British fuels.

Production of coal in France is not now equal to consumption, due to far greater needs for coal that can at present be met by the country's mines. Since the war, the developing of central heating process, gas and electricity, industries have been extended and agriculture and several other branches of business have also increased their requirements for coal.

The demand for consumption in house coal is very quiet, and consequently the Paris market prices remain unchanged.

Export Clearances, Week Ended Sept. 1, 1923

FROM BALTIMORE

	Tons
For Italy:	
Ital. SS. San Pietro	8,354
For Argentina:	
Br. SS. Illingworth	8,631
For France:	
Belg. SS. Chilier	8,199

FROM HAMPTON ROADS

For England:	
Nor. SS. Strinda, for Land's End	10,179
For Porto Rico:	
Br. SS. Carron Park, for Manati	3,276
For Holland:	
Belg. SS. Taxandrier, for Amsterdam	7,253
For Canada:	
Ital. SS. Campania, for Montreal	6,916
For West Indies:	
Nor. SS. Munorway, for Fort de France	5,516
For France:	
Fr. SS. Wesserling, for Nantes	6,914

Hampton Roads Pier Situation

N. & W. piers, Lamberts Pt.:	Aug. 23	Aug. 30
Cars on hand	1,476	1,259
Tons on hand	85,715	73,967
Tons dumped for week	114,392	145,847
Tonnage waiting	12,000	11,000
Virginian Ry. piers, Sewalls Pt.:		
Cars on hand	2,024	1,791
Tons on hand	115,140	104,350
Tons dumped for week	103,708	121,460
Tonnage waiting	14,963	4,000
C. & O. piers, Newport News:		
Cars on hand	1,515	2,047
Tons on hand	80,355	107,265
Tons dumped for week	129,590	188,714
Tonnage waiting	17,710	.....

Pier and Bunker Prices, Gross Tons

PIERS

	Aug. 25	Sept. 1†
Pool 9, New York	$5.25@$5.75	$5.35@$5.75
Poll 10, New York	4.75@ 5.00	4.75@ 5.25
Pool 11, New York	4.50@ 4.75	4.50@ 4.75
Pool 9, Philadelphia	5.25@ 5.65	*5.20@ 5.65*
Pool 10, Philadelphia	4.60@ 5.20	*4.60@ 5.10*
Pool 11, Philadelphia	4.15@ 4.75	*4.15@ 4.50*
Pool 1, Hamp. Roads	5.25	5.25
Pools 5-6-7, Hamp. Rds.	5.00	*4.60@ 4.75*
Pool 2, Hamp. Roads	5.15	*5.00*

BUNKERS

Pool 9, New York	5.55@ 6.05	5.65@ 6.05
Pool 10, New York	5.05@ 5.30	5.05@ 5.55
Pool 11, New York	4.80@ 5.05	4.80@ 5.05
Pool 9, Philadelphia	5.60@ 6.00	5.60@ 6.00
Pool 10, Philadelphia	5.00@ 5.60	*5.00@ 5.50*
Pool 11, Philadelphia	4.50@ 5.00	*4.50@ 4.95*
Pool 1, Hamp. Roads	5.25	5.25
Pool 2, Hamp. Roads	5.15	*5.00*

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to *Coal Age*

	Aug. 25	Sept. 1†
Admiralty, large	29s.@30s.	*29s.*
Steam smalls	19s.@21s.	20s.@21s.
Newcastle:		
Best steams	22s.@23s.	23s.@24s.
Best gas	23s.@24s.	23s.6d.@24s
Best bunkers	20s.@22s.	22s.@23s.

News Items From Field and Trade

ALABAMA

Ray Coal Co. has been incorporated in Montgomery, with a capital of $9,000, by F. V. Brahan, R. Crisman and others.

Goodwin Coal Co. has been incorporated in Dora, with a capital of $100,000, by Olin Goodwin, M. E. Moore and C. L. Jones.

Moss & McCormick, Birmingham, have leased 1840 acres of government mineral land in Fayette county, Ala., for coal mining, at a cost of $85,000.

The Riley & Kincaid Coal Co. has been incorporated in Henryeklen by Bush Riley, J. B. Kincaid and W. N. Lee.

The Goodwin Coal Co., of Montgomery, proposes to build a railroad in Jefferson and Walker counties to reach its coal properties.

R. A. O'Rear and Ed O'Rear, of Jasper, have **leased their Pratt Warrior coal mine,** on the Warrior River, for a period of five years, to the Gulf States Portland Cement Co., of Demopolis. The company agrees to mine and pay royalty on a minimum of 25,000 tons of coal annually.

Alabama coal men recently drew important assignments on the standing committees of the National Coal Association, as announced by President Brydon. S. L. Yerkes, vice-president of the Grider Coal Sales Company and also the owner and operator of several commercial mines, was named as one of twenty-five members of the policy committee and also is a member of the committees on goverment relations and railroad relations; J. W. Whatley, now with the Tennessee Coal Iron & R.R. Co., but who will assume charge of the sales department of DeBardeleben Coal Corporation in September, was designated as a member of the committee on foreign trade, and M. B. Lanier, of the Empire Coal Co., is a member of the publicity committee.

The Galloway Coal Co., of Memphis, Tenn., has let the contract for a brick commissary building at its plant at Carbon Hill.

One of the largest cash bonuses ever received by the government for the lease of a tract of public coal land was paid at the recent public auction at Montgomery by the Department of the Interior, when **$85,000 was offered and accepted for 1,840 acres.** Moss & McCormick, coal operators of Birmingham, made the bid. The tract is located in Fayette County, near Carbon Hill. It is estimated to contain 7,000,000 tons of high-grade bituminous coal. In addition to the $85,000 bonus the successful bidder must expend $75,000 for improvements on the property within three years and must guarantee the government a royalty of 10c. per ton annually on a minimum production of 20,000 tons of coal. The Department of the Interior previously disposed of the surface rights of practically all the 1,840 acres of land to homesteaders, having reserved the coal deposits and the right to mine them, to the government. Many coal operators of Southern states appeared at the public auction at Montgomery and there was lively and spirited bidding to obtain the lease on the public coal lands offered.

ILLINOIS

The mine of the Bissell Coal Co., five miles northeast of Springfield, **has resumed operations** after having been closed down since May 1. A new airshaft has been installed, new locomotive haulage and track scales opened and other minor improvements made. The mine employs 274 men.

Charging that the **Liberty Coal & Mining Co.,** Belleville, has exceeded the boundaries of the coal lands it owns and **has mined approximately 500 tons belonging to others,** a bill in trespass has been filed in the Circuit Court at Belleville. Plaintiffs in the action are Anna Maria Seibert; Robert, Henry C., Oscar, John F. and Theodore Seibert; Lena Helms, Hilda Dickhaut, Anita Lautenschlaeger, Ella Mueller, Meta Walters and Edna Seibert.

The mine of the Southern Coal & Mining Co., at Shiloh, near Belleville, is **undergoing extensive repairs.** Work was started three weeks ago on retimbering the main shaft and later the airshaft will undergo a similar improvement. The work is progressing somewhat slower than under ordinary conditions due to the fact that the shaft is being enlarged 5 in. on the sides to permit better handling of the boxes. It will take several weeks to complete the work. Meantime, the miners are not at work.

A verdict awarding $1,000 damages has been returned by a jury in the St. Clair County, Circuit Court in the suit of Samuel Richards against **the Gundlach Bros. Co.** Richards asked $1,250 for damages done to a 12-acre tract of land near Edgemont, caused by the roof of a mine below collapsing and the surface of the ground sinking about 1½ ft. in trenches having a total area of one-third of an acre. It was said at the trial that the coal company was willing to fill the depressions but the Richards maintained that the value of their property had depreciated and that possible purchasers would not buy because of a fear of further settling of the ground.

Members of the United Mine Workers will not be allowed to return to work in mine No. 2 of the Sangamon Coal Co., Springfield, it was announced by Superintendent John Vose, Sr. The 400 men are barred on the ground that their contract was violated when they started a walkout two weeks ago, and their organization has been sued for $16,800. The men will be given back their places when the sum is paid the operators for damages said to have been caused by the shutdown. The strike was called Aug. 2 by J. J. Young, district board member of the union, because the company refused to pay wages of Jacob Reinhardt, a locomotive engineer at the mine and a member of the miners' union, for the six months between the time he was discharged because of defective sight and the time he was reinstated at the instigation of a committee of the union which investigated the case. The amount of the company's claim for compensation for damages caused by the walkout is determined, Mr. Vose said, by figuring $3 a day for each miner.

The Babbitt mine, at Maquon, has been **leased to H. F. Eechor,** of Rich Hill, Mo. A new shaft will be sunk about 300 feet north of the old shaft and the latter will be used as an airshaft. It is expected that the mine will be in operation for the autumn and winter trade.

Suit for the appointment of a receiver to take over the properties of the Beatty Coal Co., Mascoutahs, has been filed in the Circuit Court at Belleville. The suit, which is entitled a bill in chancery, relates that 240 shares of the stock of the company are held by Howard Kerchner, Anna Kerchner and Richard S. Wangelin, while thirty shares are held by the Beatty brothers. Kerchner is president of the company, Nephi Beatty, vice-president and Wangelin, secretary. Last month the mine was closed down by the state authorities on the ground that it was unsafe. It was stated that the shaft needed retimbering. At that time there were outstanding claims against the company of $2,109.88, most of which was due miners. The bill states that $3,000 is required to repair the mine to meet state requirements.

INDIANA

The Ogle Coal Co., of Indianapolis, has increased its capital stock from $100,000 to $150,000.

The Indiana Hocking Coal Co., of Terre Haute, has filed certificate of final dissolution.

The Wilfred mine, northeast of Sullivan, which has been shut down for several months, is being cleared up, preparatory to **resuming operations.** The mine employs 200 men.

Work on the E. & I. division of the Big Four R.R. is progressing rapidly. Samuel D. McLesh, of Evansville, an officer of the company, is authority for the information that the work of replacing rails will extend as far as Elberfeld during this month. Curves in the road at Petersburg and Washington are being straightened. The company hopes to make the E. & I. division the heaviest coal carrier in the state as a result of the completion of the $1,000,000 improvements now under way. The road will be able to handle 1,000 cars of coal daily during the rush season when the improvements are completed.

The Southwestern Indiana Coal Corporation has been incorporated to mine and deal in coal, with offices at Evansville. The capital is $200,000. William F. Tuarrie, Frederick W. Reeve, Tom J. Phillips, Loris G. Julian and L. C. Oliver are the incorporators.

The Enterprise Coal & Mining Co., of Sullivan, has filed a preliminary certificate of dissolution.

IOWA

The Peoples Fuel Co., Cedar Rapids, has been incorporated with capital of $20,000 by Frank J. Chramosta, president; W. F. Kubig, vice-president; George J. Naxers, secretary; and Frank O. Kanak, treasurer.

Leases are being obtained and **drilling is expected to start soon on land in the vicinity of Decatur for coal** and oil. Some delay has been experienced in getting the leases but this trouble is expected to be overcome and work is to start soon.

KENTUCKY

The North Star Coal Co. has been incorporated in Madisonville with a capital of $100,000, by L. C. Oliver, L. P. Sisk and others.

Walter Waltrip, formerly manager of the Grapevine Coal Co., at Madisonville, who recently took charge of a new buying office at Madisonville, for the Phoenix Fuel Co., Louisville, has joined the Louisville office of the company, where he will be actively engaged in the future.

Val Bittner, organizer for the United Mine Workers, has called **a meeting of the Straight Creek and other organized mining districts in southeastern Kentucky** for the first week in September. These miners are working under what is known as the "Knoxville agreement" and in event of a strike in the hard coal field it is apparent that Bittner intends to rekindle the trouble that there was in southeastern Kentucky three years ago.

MARYLAND

Five were shot in rioting and clashes between union and non-union miners at Frostburg on the night of August 26 as a result of intense feeling which developed over the slaying of George Porter, a union miner of Zihlman.

With the purchase of 800 acres of coal land by the Stanley Coal Co., Inc., from John A. Connell, Ellen Connell and Parley DeBerry, **further development of coal properties in Garrett County is presaged.** The acreage thus acquired is on the line of the Baltimore & Ohio near Hutton and borders on the West Virginia-Maryland state line, extending as far south as Crellin. The price paid is understood to have been $20 an acre. The coal acquired ranges from 3 to 5 ft. in thickness. The purchasers of the Connell tract will develop on an extensive scale, driving new openings and erecting the necessary tipples and other plant buildings.

MASSACHUSETTS

A resolution uging the government to take over and operate the coal mines of the country was adopted at the convention of the Amalgamated Shoe Workers of America at Boston, Aug. 22. The secretary was instructed to send copies of the resolution to President Coolidge and the members of both houses of Congress. As reasons for the suggested government action the resolution charged that New England and other sections of the country face a coal shortage "because a few favored men are permitted to monopolize and gamble in a necessity of life."

Resolutions have been sent to President Coolidge and Attorney General Daugherty by the Associated Industries of Massachusetts, comprising more than 1,500 manufacturers, opposing any recognition of the "check-off," and declaring "the action of the United Mine Workers of America in threatening to deprive not only New England but the entire American public of a sufficient supply of anthracite coal unless they be granted a monopoly of employment is opposed to the public interest and recognized public policy and should, therefore, be resisted."

MINNESOTA

F. A. Taplin, of the Western Coal Co., Cleveland, and **Mr. Hutchinson and Mr. Atwater, Jr.,** of the W. C. Atwater Coal Co., of Cleveland, visited Duluth last week. They are interested in the Inland Coal & Dock Co. property and were on a tour of inspection.

These officers of the Washburn Lignite Coal Co., of Minneapolis, were recently

elected: W. P. McComber, president; Stanley Washburn, vice-president; Jefferson Steiner, secretary-treasurer. W. H. Keller, who has been secretary-treasurer of the company since its incorporation in 1902, retired at the age of 78. He remains a director.

The answer of the Great Lakes Coal & Dock Co., Minneapolis, to the suit of the West Jellico Coal Co., Paducah, Ky., for damages for alleged breach of contract sets up that **the Jellico company nullified its contract through failure to deliver coal as agreed during the early months of the contract.** The defendant says that had there been delivery during the first five months of the contract it could have used the coal to good advantage, but when the bottom fell out of the market, then plaintiff was eager to deliver at the high price, while the defendant was then able to get a better grade of coal elsewhere for no more money.

A suit for damages for breach of contract has been filed in Minneapolis by the West Jellico Coal Co., Paducah, Ky., against the Great Lakes Coal & Dock Co., Minneapolis. The complaint sets forth that a contract was made to furnish the Great Lakes Company with two cars of coal a day from June 26, 1920, to March 31, 1921, at $4 a ton, but if car shortage should prevent complete delivery, the delivery should be on a pro rata basis as compared with the total contract business of the mine. Cost of production is set at $1.82 a ton, and the headline writers see in the difference over 100 per cent profit. The complaint sets forth that car shortage did prevent full deliveries during June, July, August and September, but contends that deliveries were made as agreed and adjusted with the defendant but that in October there was a drop in the market and defendant was able to get coal from other sources at reduced prices and declined to give shipping orders on the contract, though they were often requested. Within the period from Oct. 25, 1920, to March 31, 1921, the defendant should have received 262 cars averaging 49 tons each, which plaintiff claims it was able to deliver, aggregating 12,838 tons of coal at a total price of $51,352. Complaint sets forth a loss of profit of $27,986 by the non-performance of contract and asks $6,543 additional cost of operation on reduced output which added 35c. to 36c. a ton.

MISSOURI

The Edgar Zinc Co., of St. Louis, has paid $77,000 for 159 acres of coal land and a big steam shovel that has been operated four miles southeast of Liberal in Barton County. The shovel and part of the land belonged to the Barton County Coal Co.

Walter and Elmer McDavid have purchased a one-third interest in the coal mine at Excelsior Springs, paying, it is reported, $25,000 for the holdings. Perry Rice, the seller, will devote all of his time to his mine at Rayville. There will be no change in the management or operaiton of the Excelsior Springs mine.

The St. Louis & O'Fallon Coal Co., of Illinois, with a capital of $150,000, has been incorporated in Missouri with a capital of 250,000 and with headquarters in St. Louis. The incorporators are: E. L. Thomas, H. M. Needles and W. A. Reiss.

Coal in Carthage contracted for the various school is selling at about 25c. a ton less than a year ago. **The School Board now is paying $3 a ton for best mine run and $4 for the best lump** on the track at the mines at Pittsburg, Kan.

A new company has been organized at Yates to engage in strip-mining on the Stahlman farm and a stripping machine has been purchased at a cost of $45,000 to carry on the work. The coal will be hauled by trucks from the farm to Yates over a road that will be oiled by the coal company.

The Kansas City Midland Coal & Mining Co. has closed mine No. 7, at Novinger, under order of Emmett Corrigan, general manager. C. H. Charleton, superintendent of the mine, declared that rock is falling so fast that more rock is being mined than coal. Three hundred miners are affected by the shutdown.

Operators of coal mines in Fulton announce that they will file an injunction suit with Judge David H. Harris of that city to prevent the board of managers of the Missouri School for the Deaf from carrying out a contract for the delivery of coal with a Moberly company on the ground that the bid was accepted contrary to law and contrary to their advertisement for the receipt of bids. According to statements given out by attorneys who have been retained by the Fulton operators the bid of the Moberly concern was for coal delivered at the station in Fulton, whereas the law requires that the bids be on the basis of coal delivered to the institution. As a result there was no way to draw a comparison on the bids yet the Fulton operators contend that their bid was the lowest. Their bid was for coal delivered to the institution. Officials of the School for the Deaf said they had not yet entered into a contract with the Moberly company and will await the outcome of the injunction suit.

NEBRASKA

Governor Charles W. Bryan on Aug. 20 announced that he was making arrangements **to have the state supply cities, villages and public committees with coal at $6.25 a ton,** f.o.b. Lincoln, with an additional delivery charge of not more than $2 a ton. He said that he was moved to this action by the fact that, although the price of coal at the mines had been reduced $1.25 a ton, Lincoln dealers were selling it at the same price quoted last winter and spring. With the maximum $2 delivery charge, the state would furnish coal at $8.25 a ton. Lincoln dealers are charging $9.50 a ton for delivered coal.

NEW YORK

Wesley Lieb, who was sales manager of the Majestic Coal Co., New York City, **has been placed in entire charge of sales.** Three additional salesmen have been added to the sales force. A. J. Jaeger and E. J. Fraunheim will look after the New Jersey trade, and A. P. Crouze will cover the New England States.

Certificates of incorporation were filed Aug. 23 in the office of the Secretary of State at Albany, by the **Williams Fuel Corporation,** of Manhattan Borough, New York City, to deal in coal, coke, etc. The capitalization is 100 shares of common stock of no par value and the incorporation will commence business with $500 paid in. Directors are Henry M. Williams, James E. Doherty and Patrick Doherty. Attorney for the corporation is James E. Doherty, of 150 Nassau St., New York City.

A certificate of incorporation has been filed in the office of the Secretary of State at Albany by the **New York Central & Lake Shore Fuel & Products Co.,** Inc., of Troy, to deal in peat for fuel and fertilizer. The company is capitalized at $15,000, of which $2,500 is paid in. The directors are: Neils Schmidt, Troy; John A. Griffin, Watervliet, and George Benedict, Albany, N. Y. The attorney for the corporation is Henry J. Crawford, 128 State St., Albany.

A certificate of incorporation has been filed in the office of the Secretary of State at Albany by the **Wilba Coal Co., Inc.,** of New York City. The corporation is capitalized at 100 shares of common stock of no par value and begins business with $500. The directors are Charles E. Kelley, L. B. Grunder and A. G. Levick, all of 366 Madison Avenue, New York City. Attorneys for the corporation are Kelley & Becker, of 366 Madison Avenue.

The Lake Shore Coal & Coke Co., Inc., of Buffalo has filed a certificate in the office of the Secretary of State at Albany, reducing its capital from $50,000 to $5,000.

Albee & Albee, Inc., Buffalo, has filed a certificate of incorporation, to deal in coal, ccke and builders' supplies. The corporation is capitalized at $20,000, but begins business with $10,500. Directors and subscribers to stock, E. H. Albee, H. M. Albee, and Wm. E. Mason, Buffalo; attorney, H. M. Albee, Buffalo.

In a letter to Governor Smith, Assemblyman **George N. Jesse,** last week, **suggested an extraordinary session of the Legislature to re-enact the legislation of last year under which a fuel administrator was appointed** by the Governor. Viewing "with grave alarm" the possibility of a stoppage in the mining of hard coal, with its resulting hardships, a situation similar to that existing a year ago, the Assemblyman says he would be glad to co-operate with the Governor in drafting a more drastic law than that which expired in April. Senator James J. Walker, Senate leader, hearing of Assemblyman Jesse's action, expressed the opinion that state officials could do very little in the situation, as no coal is mined in this state.

OHIO

J. Benham has qualified as trustee in bankruptcy in the case of the Clear Creek Coal Co. and has been accepted by Commissioner Greve.

E. K. Brooks, traffic manager of the W. E. Deegans Coal Co., of Huntington, was a visitor in the Cincinnati market during the latter part of August.

Assistant District Attorney A. Lee Beatty, of the southern district of Ohio, has prepared **his answer to the suit of the Houston Coal Co.,** seeking to recover $314,000 for coal that was delivered to the navy under requisition.

The eleventh annual midsummer outing of the Cincinnati Coal Exchange was held at the North Cincinnati Gym. grounds at Bass Island on July 24 with over 100 in attendance. It was the largest gathering of coal men at such an affair in the history of the organization. Weightman D. Roberts, as a delagate from the Charleston Coal Exchange, asked that delegates be selected to attend a meeting in Columbus to look to the formation of a National Coal Inspection Bureau. In a talk to the Exchange Mr. Roberts declared that it was necessary that such an organization be effected in order to counteract the inordinate number of rejections that have been made during the past few months. He said that these were really controlling the downward trend in price. A special meeting of the Exchange was called to consider the problem. The outing closed with a ball game in which the LowVolatile side won from the HighVolatiles by a score of 12 to something or other.

The Columbus Coal Bureau, a social coal club, composed of producers and jobbers, was organized at a meeting of about fifty representative concerns, at the Chittenden Hotel, Aug. 3. While the organizers are not disposed to give a complete description of the objects of the organization, it was denied that it was the intention to affiliate with the proposed National Coal Inspection Bureau, although some of those present appeared to believe that such was the object. The organization is the outgrowth of a number of informal meetings of the coal men in the producing and distributing ends of the industry. A board of directors, consisting of Fred W. Braggins, president of the Lorain Coal & Dock Co.; John M. Taylor, head of the J. M. Taylor Coal Co.; J. A. Teegardin, sales manager of the New York Coal Co.; C. M. Anderson, western manager of the Elk River Coal & Lumber Co.; Jay Miller, president of the Jay Miller Coal Co., and T. C. Collins, of the Ajax Block Coal Co., was named. The directors met and after discussing the situation decided to put off the selection of officers for a week, in order that the situation could be canvassed.

PENNSYLVANIA

Joseph E. P. Bonsall has been made manager of the Philadelphia office of the Bowman Coal Co., in the place of Archibald W. Garvin, who has severed his connections with this company.

TENNESSEE

The Southern Fuel Corporation, of Chicago, Ill., has acquired and will develop 25,000 acres of coal land in Tennessee.

TEXAS

The Palestine Coal Co. has been incorporated in Palestine, with a capital stock of $150,000, by R. McDonald, T. C. Ritchey and L. A. Wadsworth.

WEST VIRGINIA

A visitor in the New River field of West Virginia a few days ago was **Robert Green,** in charge of the coal department of the Matthew Addy Coal Co., of Cincinnati.

C. H. Jenkins, vice-president of the Hutchinson Coal Co., of Fairmont, was a visitor in Eastern markets during the latter part of August.

Construction of a bridge across Elk River at upper Clendenin, in Kanawha County, **is being urged** as a means of making possible the development of what is said to be one of the best veins of coal on Elk River.

C. E. Cowan, of Greensburg, Pa., chief engineer of the Jamison Coal & Coke Co., spent a few days in Marion County, during the latter part of August.

Charles E. Hawker, well known in northern West Virginia mining circles, was a recent visitor in New England.

J. R. Thomas, president of the Carbon Fuel Co., of Charleston, has almost completely recovered from a recent illness.

M. K. Dobbie, of the Robinson Coal Co., and his brother, **W. C. Dobbie,** general superintendent of the Jamison Coal & Coke Co., in the Fairmont region, found it necessary to go to Douglas late in August owing to the serious illness of their father.

R. A. Pollock, formerly president of the Rivesville Coal Co., the properties and mines of which were sold not long ago to the Edward Hines interests of Chicago, **has completed plans for the purchase of the mine of the Balkan Coal Co.** at Dola on

the West Virginia Short Line of the Baltimore & Ohio R.R. The mine is being cleaned up preparatory to resuming operations, with the new owner in charge, in the near future.

Some idea on the large scale upon which operations are being conducted in the Scott's Run field of Monongalia County may be obtained from the fact that **$284,590.99 was paid out in wages by one bank in Morgantown** toward meeting the payrolls of several coal companies for the first half of August, representing the work done during the latter part of July.

The Glenn Valley Coal Co., which was organized in July, has purchased two tracts of coal land in Ohio County aggregating about 56 acres, with a view to development. The consideration involved was approximately $30,000. In one tract there were 31 acres, for which $12,000 was paid, and in the other tract there were 26 acres, for which $18,000 was paid.

Early this month in Greenbrier County there will be a **reopening of the investigation into the alleged attempts** of agents of the United Mine Workers **to bribe jurors** in the case of William Blizzard, president of subdistrict 2, District 17, charged with the murder of George Munsey in connection with the armed march on Logan County in 1921. Blizzard's first trial ended in a disagreement of the jury. It will be recalled that following rumors that the United Mine Workers were using money to influence jurors and prospective jurors, Judge Summers H. Sharp summoned a grand jury, which filed true bills against H. R. Harrah, widely-known farmer who had served as foreman on the jury which had been unable to agree upon a verdict, and against G Clarence Hickey, an agent for the miners' union. Blizzard is also slated for a second trial soon after Sept. 7, when the regular term of court begins. A new jury will be summoned, as every member of the jury panel summoned for the second trial was dismissed by Judge Sharp when it became known that efforts were being made to influence prospective jurors.

George Wolfe, secretary of the Winding Gulf Operators Association, with headquarters at Beckley, was a visitor in Huntington recently, attending a traffic meeting there.

J. O. Caldwell, chief clerk of the Northern West Virginia Coal Operators Association was a recent visitor in Charleston. His headquarters are at Fairmont.

Fire of unknown origin completely destroyed the tipple at the No. 2 mine of the Eagle Island Coal Co. at Lax, in the Logan County field, late in August and at the same time seriously damaged three motors, one cutting machine and two mine cars. The damage wrought is estimated to have been approximately $40,000 part of which sum is covered by insurance. The tipple was located about 800 ft. up the side of a mountain and a large steel bucket used to convey coal to a lower tipple tumbled down the mountain side when its cables were burned, almost completely demolishing the lower structure. It was necessary to shut down the mine following the fire, the miners being transferred to the No. 1 mine of the company. It will require several months to complete repairs so that the No. 2 mine may be operated again.

West Virginia's exhibit at the second **annual exposition of the Women's Activities Association** to be held at the Commodore hotel in New York on Sept. 24 will consist of working models of coal-mining equipment, photographs of West Virginia mining towns and samples of the various grades of coal mined in the state. Arrangements were made by J. O. Caldwell, secretary of the Northern West Virginia Coal Operators Association, for the exhibits from the southern part of West Virginia. The Women's Activities Association is an auxiliary of the Federated Business and Professional Women's clubs and the exhibition is to be held for the purpose of showing the principal industries of the various states in the Union.

WASHINGTON, D. C.

The Foreign Trade Committee of the National Coal Association for the coming year embraces the following: C. E. Bockus, president, Clinchfield Coal Corporation, New York; Lemuel Burrows, president, Castner, Curran & Bullitt, Inc., New York; G. H. Caperton, president, New River Coal Co., Charleston, W. Va.; G. Dawson Coleman, Sr., president, Marshall Coal Co., Philadelphia; George M. Dexter, president, Dexter & Carpenter, Inc., New York; T. F. Farrell (chairman), second vice-president, Pocahontas Fuel Co., New York; George H. Francis, secretary, Keystone Coal & Coke Co., Greensburg, Pa.; R. H. Gross, president, New River Co., Boston; Kuper Hood, general manager, Houston Coal Co., Cincinnati; R. H. Knode, vice-president, Stonega Coal & Coke Co., Philadelphia; F. A. Sweet, president, Standard Coal Co., Salt Lake City, Utah, and F. W. Wilshire, vice-president, Consolidation Coal Co., New York.

CANADA

Output of coal from Canadian mines during May amounted to 1,252,000 net tons, a decrease of 3 per cent from the tonnage for the previous month, but an increase of 29 per cent over the average for the month of the preceding years. The output for the month showed decreases of 30,000 tons in British Columbia, 25,000 tons in Nova Scotia and 12,000 tons in Saskatchewan. In Alberta there was an increase of 29,000 tons and in New Brunswick 3,000 tons. The cumulative output from all mines for the five months of 1923 amounted to 7,406,100 tons, an increase of 26 per cent over the preceding three-year average for the same period. Comparison of May and April figures covering the importation of coal from the United States and Great Britain showed an increase of 44 per cent. May imports amounted to 1,683,700 tons, while in April 1,171,200 tons was brought in. The May importations this year were 73 per cent greater than the preceding three-year average for the month. There were no imports from Great Britain during the month. Total importation of all coal for the five months of 1923 was 7,640,500 tons, an increase of 42 per cent over the three-year average for the period. The imports of anthracite for May totalled 433,000 tons. This was 4 per cent greater than in April and 52 per cent higher than the three-year average for the month. All of the anthracite imported in May came from the United States. The total amount imported during the five months of 1923 was 2,186,000, an increase of 44 per cent over the three-year average for this period. Exports of Canadian coal during May were 23 per cent less than in April. The quantities were: May 99,100 tons, April 128,600. Comparison of the May exports with the preceding three-year average showed a decrease of 22 per cent.

Obituary

James R. Bresnan, a well-known business man of Brockville, Ont., and head of the retail coal firm which bears his name, died recently in that city at the age of 76. He was a native of Buffalo.

C. J. Thomas, representing the Morton Gardner Electrical Co., of Chicago, was crushed to death between two cars in the mines of the Moffett Coal Co., at Blocton, Ala., Aug. 11, while demonstrating the equipment to officials of the coal company.

Joseph R. Smith, superintendent of houses at the Johnetta Mine of the Bertha-Consumers Co., died recently at Johnetta, Pa. Mr. Smith had been married almost fifty years and during his entire life he was in constant employ of the Jones interests. He was the father-in-law of David McKelvey, a member of the Johnetta first-aid team, which at the time of his death was en route to Salt Lake City to attend the International meet. Funeral services were held at Johnetta, Pa., Sunday, Aug. 26.

J. Eugene Dana, retired coal operator and prominent citizen of Charleston, W. Va., for many years, died late in August at Cresmont Manor Farm, Keswick, Va., near Charlottesville, where he had gone to spend the summer. Mr. Dana's death was the direct result of a series of strokes of apoplexy, from which he had suffered for several weeks prior to his death. He was not only interested in coal companies but also in many other enterprises in Kanawha County, W. Va.

Charles Crocker Bussey, inventor of the Bussey Process, died suddenly Aug. 29 while visiting his family home in Winterport, at the age of 57 years. His home was in Brooklyn. His inventions constituted a great economic advance in the method of low-temperature distillation of coals in the production of oil, coke distillates and gas from bituminous coals, cannels, lignites and oil shales and his passing away came at the crowning moment of his life after devoting many years to the development of his process. Mr Bussey was born Jan. 16, 1866, in Newburgh, Me., the son of a sea captain and one of a family of nine children. He was a decendant of Benjamin Bussey, founder of the Bussey Institute of Harvard University. His early education was received in the local schools and at Bucksport Seminary with intervals of work on farm and sea. He was graduated from the Massachusetts Institute of Technology in 1895.

Victor White, Western manager for the Flat Top Fuel Co., died recently at his home in Fort Thomas, Ky. He had been ill for over a year, first from an automobile accident, then influenza and finally typhoid fever. He got his early training in the coal business with the Berwind Fuel Co. in Chicago, joining the Flat Top organization about ten years ago and opening their Cincinnati office some six years since. He had been vice-president of the Cincinnati Coal Exchange and was one of the prime movers in the organization of the Cincinnati Coal Trade Golf Association. He was 38 years of age and leaves a wife and three children.

Traffic News

Notwithstanding reports that there has been curtailment of coal shipments, figures covering coal tonnage handled by the Chesapeake & Ohio and the Norfolk & Western in southern West Virginia in July show an actual **increase over June or more than a quarter of a million tons for each road.**

During the latter part of August President C. W. Huntington; Vice President C. H. Hix, Chief Engineer H. Farnstrom and Electrical Engineer Clark, of the Virginian Ry., visited the Winding Gulf field for the purpose of studying the **extensive improvements contemplated by the road** and more especially the electrification of the road from Mullens to Roanoke, Va.

Locomotives in need of repair on Aug. 15, totaled 11,571, or 18.1 per cent of the number on line, according to the Car Service Division of the American Railway Association. This was an increase of 16 over the number in need of repair on Aug. 1, at which time there were 11,555, or 18.1 per cent. The railroads on Aug. 15 had 2,667 locomotives in storage ready to be used whenever traffic conditions warranted. This was an increase of 117 over the number in storage on Aug. 1.

At a meeting at Deer Park, Md., late in August, the **Northern West Virginia Operators Association retained the service of E. J. McVann**, traffic attorney, of Washington, D. C., **to handle its rate fight** before the Interstate Commerce Commission. This involves the petition of the operators in the Pittsburgh No. 8 field of Ohio and in the Pittsburgh district attacking all coal rates to the lakes from Fairmont and Kentucky. Already southern West Virginia producers are making a fight to maintain the present rates. The northern West Virginia Association contends that the freight rates of the Pittsburgh field and the No. 8 field are unjust to the Fairmont district. The understanding is that the Baltimore & Ohio R.R. will assist or co-operate with the Northern West Virginia Association in its case before the Commerce Commission. At the Deer Park meeting the Northern West Virginia Association was represented by C. H. Jenkins, George S. Brackett and Brooks Fleming, all of Fairmont; A. Lisle White, of Clarksburg; E. W. Ziler, of Elkins, and George Connell, of Connellsville.

Coming Meetings

New York State Coal Merchants' Association will hold its annual convention on Sept. 10-12 at Sacandaga Park, N. Y. Executive secretary, G. W. F. Woodside, 250 Arkay Building, Albany, N. Y.

Oklahoma Coal Operators' Association will hold its annual meeting Sept. 13 at McAlester, Okla. Secretary, A. C. Casey, McAlester, Okla.

The American Mining Congress will hold its twenty-sixth annual convention in conjunction with the **National Exposition of Mines and Mining Equipment**, Sept. 24-29, at the Milwaukee Auditorium, Milwaukee. Secretary, J. F. Callbreath, Washington.

National Safety Council will hold its twelfth annual safety convention at the Buffalo Statler Hotel, Buffalo, N. Y., Oct. 1-5. Secretary, W. H. Cameron, 168 No. Michigan Ave., Chicago, Ill.

The West Virginia-Kentucky Association of Mine, Mechanical and Electrical Engineers will hold its annual meeting Oct. 19-20 at Huntington, W. Va. Secretary-treasurer, Herbert Smith, Robson-Prichard Bldg., Huntington, W. Va.

Coal Mining Institute of America will hold its annual meeting Dec. 19, 20 and 21 at Pittsburgh, Pa. Secretary, H. D. Mason, Jr., Chamber of Commerce Building, Pittsburgh, Pa.